Ephemerides, &c. ~~756.a.6~~
2
PP.2465/2

THE
Gentleman's Diary,
OR THE
MATHEMATICAL REPOSITORY;
An ALMANACK
For the YEAR of our LORD 1756.
BEING
The BISSEXTILE, or LEAP-YEAR.

Containing many uſeful and entertaining Particulars, peculiarly adapted to the ingenious Gentlemen engaged in the delightful Study and Practice of the
MATHEMATICKS.

The Sixteenth *Almanack* publiſhed of this Kind; and the Fourth of the NEW STYLE in *England*.

——— Quâ causâ argentea Phœbe
Paſſibus haud æquis graditur; cur ſubdita nulli
Hactenus Aſtronomo numerorum fræna recuſat:
Cur remeant Nodi, curque Auges progrediuntur.
——— Quantis reſluum vaga Cynthia pontum
Viribus impellit; dum fractis fluctibus ulvam
Deſerit, ac Nautis ſuſpectas nudat arenas,
Alternis vicibus ſuprema ad littora pulſans.

LONDON,
Printed for the Company of STATIONERS.
MDCCLVI.

ADVERTISEMENT.

ALL Perſons who are pleaſed to be CONTRIBUTORS to this DIARY; by anſwering the QUESTIONS, ÆNIGMAS, &c. or by ſending us new ones, or other Subjects proper for the WORK; are deſired to ſend them, and their Solutions, along with them, before the firſt Day of *May* 1756, directed for *The Authors of the* GENTLEMAN's DIARY, to be left with Mr. *JOSEPH HOW*, at the *White Horſe* at *Cripplegate*, LONDON: or, with Mr. *THOMAS PEAT*, in *Caſtlegate*, *Nottingham* (Poſt paid.)

To the PUBLICK.

HAVING always more Room in the Kalendar Part of our Diary than we can poſſibly fill up with *good Weather*; we *expect* that an exact Account of all the FAIRS in *England*, as fixed ſince the Regulation of the *Style*, will ſupply that Room better than *bad Weather*; and alſo be of more general Service to *Tradeſmen*, *Dealers*, &c. according to the *Plan* in the KALENDAR this Year; and if this be agreeable, ſhall for the future publiſh them annually, according to the beſt Information we can procure from our Contributors in their reſpective Neighbourhoods, &c.

Queſtion propoſed in a Letter from Mr. *Chriſtopher Cooke* of *Burton* near *Loughborough*.

Qu. If *Pope Gregory* XIII. in 1582 (which is 173 Years ſince,) did reform the *Ephemeris*, ſetting it forward 11 Days; and did not at the ſame Time make a proper Deduction of eleven Minutes, to bring the Year to a *preciſe* Length; then they which go by *that Style* muſt be wrong again now, and conſequently we. But, if in Caſe the Year was at the Time abovementioned reduced to an exact Length,—then how comes it to paſs at our late Regulation, that we, who have followed the *Julian Epocha* ever ſince 45 Years before the Birth of CHRIST, as it was then ſettled, ſhould be no more than eleven Days in an Errour?

JANUARY hath XXXI Days.

New Moon the 2 Day, 48 Min. before 1 Morn.
Firſt Quarter the 9 Day 28 Min. paſt 7 Morn.
Full Moon the 17 Day, 3 quarters after 10 Morn.
Laſt Quarter the 24 Day, 5 Min. paſt 6 at Night.
New Moon 31 Day, a Quarter paſt Noon.

M D	☉ Decl. South	
1	23°	0
6	22	30
11	21	48
16	20	56
21	19	53
26	18	42

1	Th	Circumciſion, New Year's Day.	☽ Riſes		1	34
2	F	The Days are now upon the increaſe,	Sets		0A	33
3	S	having gained about 13 min.	6A	10	1	28
4	D	2 Sunday after Chriſtmas.	7	20	2	24
5	M	Old Chriſtmas Day.	8	34	3	15
6	Tu	Epiph. CHRIST's ✱ app. to Gentiles.	9	43	4	0
7	W	*Days now grow longer,* &c.	10	49	4	45
8	Th	Lucian, Prieſt and Martyr.	11	53	5	29
9	F	*Canterbury.*	Morn.		6	12
10	S	Princeſs ELIZABETH born.	0	57	6	57
11	D	1 Sunday after Epiphany.	1	59	7	37
12	M	Old New Years Day. Plow-Monday.	2	59	8	23
13	Tu	Hilary, Biſh. and Conf. *Preſton,* Lanc	3	58	9	8
14	W	Days increaſed half an hour.	4	56	9	56
15	Th	*Barſton,* York ſhire.	5	49	10	42
16	F	*Hickford,* Lanc.	6	37	11	35
17	S	*Taviſtock,* Devonſhire.	☽ Riſes		Morn.	
18	D	2 Sunday after Epiphany.	5A	45	0	27
19	M	Day 8 hours long. *Preſton,* Lanc.	6	53	1	17
20	Tu	Oct. Hil. 1. Ret. Fabian B. of Rome	8	3	2	7
21	W	Agnes, Rom. V. & Mar. *Briſtol.*	9	14	2	56
22	Th	Vinc. Span. Deac. Mar. *Shefford,* Bedf	10	28	3	44
23	F	Hilary Term begins.	11	43	4	37
24	S	*Derby. Shirley-Street,* Warw.	Morn.		5	27
25	D	3 Sun. aft. Epiph. St. PAUL's Conv.	0	57	6	18
26	M	Nights are now growing ſhorter.	2	11	7	14
27	Tu	Quind. Hil. 2. Ret.	3	25	8	10
28	W	Day 8 hours and half long.	4	33	9	5
29	Th	*Grampound,* Cornwall.	5	35	10	2
30	F	K. CHARLES I. Martyr'd at *White-*	6	27	11	1
31	S	*Hall* 12 min. paſt 1, 1649.	☽ Sets		12	0

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Riſes	♂ Sets	♀ Sets	☿ Riſes	Cl. Faſt.
1	8h 4'	3 56'	5A 27	0M 43	8 M 36	5A 10	7 M 5	4 12'
6	8 0	4 0	5 8	0 24	8 5	5 23	7 21	6 30
11	7 55	4 5	4 49	0 5	7 37	5 36	7 34	8 34
16	7 50	4 10	4 32	11A 40	7 9	5 51	7 43	10 21
21	7 43	4 17	Riſes	11 20	6 42	6 6	7 49	11 58
26	7 36	4 25	7M 28	11 0	6 16	6 22	7 50	13 8

FEBRUARY hath XXIX Days.

Firſt Quarter the 8 Day, half paſt 4 Morn.
Full Moon the 16th, 19 min. paſt 2 Morn.
Laſt Quarter the 23d, 42 m. paſt 1 Morn.

M D	☉ Decl. South.	
1	17°	7
6	15	38
11	14	0
16	12	20
21	10	30
26	8	40

M D	W D	Sundays, Holy and remarkable Days, Length, Incr. Days, Terms, Fairs, &c.	☽ Riſes and Sets	Moon South
1	D	4 Sunday after Epiphany.	5 A 59	0 A 52
2	M	Candlemas, or Purif. B. V. Mary.	7 11	1 44
3	Tu	Blaſius, Biſh. and Mart. Cr. Pu. 3 Ret.	8 22	2 33
4	W	(*Bath*, Som. 3. *Lynn*, Norf.	9 29	3 21
5	Th	**Agatha** Sicil. V. and M. *Plymouth.*	10 34	4 5
6	F	Days are now 9 hours and 24 minutes;	11 37	4 47
7	S	and Nights 14 hours 36 min. long.	Morn.	5 29
8	D	5 Sunday after Epiphany.	0 40	6 12
9	M	*Namptwich*, Cheſh. *Stamford*, Linc.	1 41	6 59
10	Tu	Octab. Purif. 4 Ret.	2 38	7 43
11	W	*Llandyſſel*, Monm.	3 33	8 36
12	Th	Term ends.	4 26	9 23
13	F	Old Candlem. *Dorcheſter. Doncaſter.*	5 11	10 12
14	S	**Valentine**, Biſh. and M. *Bromley*, K.	5 51	11 5
15	D	Septuageſima Sunday.	6 27	11 56
16	M	Days are now increaſed and Nights	☽ Riſes	Morn.
17	Tu	ſhortened 2 hours and 20 min.	6 A 58	0 49
18	W	*Nun-Eaton*, Warwickſh.	8 13	1 40
19	Th	*Beverley*, Yorkſhire.	9 29	2 29
20	F	*Llandaff*, Glam.	10 45	3 22
21	S	*Norton*, Oxf.	Morn.	4 12
22	D	Sexageſima Sunday.	0 1	5 9
23	M	*Godalming*, Surry. *Oundle*, Northa. (Faſt	1 13	6 4
24	Tu	St. MATTHIAS Ap. & M. *Bath.*	2 22	6 59
25	W	*Feverſham*, Kent. *Caernarvon.*	3 25	7 54
26	Th	*Oundle*, Northampt.	4 20	8 52
27	F	Day 10 hours and above 3 quar. long	5 6	9 52
28	S	*Cheſterfield*, Derbyſhire.	5 46	10 42
29	D	Quinq. or Shrove Sunday.	6 17	11 35

M D	☉ Riſes	☉ Sets	♄ Riſes	♃ Riſes	♂ Sets	♀ Sets	☿ Sets	Cl. faſt
1	7h 26′	4h 35′	7 M 6	10 A 37	5 M 47	5 A 40	4 A 50	14′ 11′
6	7 18	4 42	6 47	10 16	5 25	5 57	5 24	14 34
11	7 10	4 51	6 28	9 56	5 5	7 13	5 58	14 46
16	7 0	5 0	6 10	9 35	4 47	7 29	6 31	14 40
21	6 51	5 10	5 53	9 14	4 31	7 45	6 55	14 15
26	6 41	5 20	5 35	8 53	4 15	8 2	7 6	13 33

MARCH hath XXXI Days.

New Moon 1 Day, 6 min. paſt 2 in the Morning.
First Quarter the 9th, a quarter paſt 1 Morning.
Full Moon the 16th, 26 min. paſt 3 Afternoon.
Laſt Quarter the 23d, 3 quarters after 8 Morning.
New Moon the 30th, 7 min. paſt 5 Afternoon.

M D	☉ Decl. South
1	8 20
6	6 27
11	4 30
16	2 32
21	North
26	1 25

1	M	**David** Archb. Minev. ☉ Ecl. invis.	☽ Sets	0 A 26
2	Tu	Cedde, or Chad. B. Litc. ShroveTueſ.	7 12	1 14
3	W	Aſh-Wedneſday. 1ſt Day of Lent.	8 19	1 57
4	Th	*Melton Mowbray*, Leic. *Darlington*, Dur.	9 24	2 42
5	F	*Blandſord*, Dorſetſhire.	10 30	3 26
6	S	*Bourne*, Lin. *Walden*, Eſſ. *Lavenham*, Suf.	11 31	4 9
7	C	Quadrageſima, 1 Sunday in Lent.	Morn.	4 54
8	M	*Corſham*, Wilts (7) and *Stoke*, Suff.	0 30	5 38
9	Tu	Day 12 hours 18 min. long.	1 27	6 27
10	W	Ember Week.	2 19	7 1
11	Th	Days are now encreaſed 3 hours & half.	3 8	8 5
12	F	**Greg.** M. B. of R. & C. *Culliford*, Dev.	3 51	8 5
13	S	Days are increaſing every Day.	4 30	9 48
14	C	Reminiſcere, 2 Sunday in Lent.	5 2	10 41
15	M	*Oakham*, Rut. *Oſweſtry*, Shropſh. *Langa-*	5 23	11 34
16	Tu	*Penſance*, Cornw. [*dock*.	☽ Riſes	Morn.
17	W	*Hariff*, Hunt. *Malmſbury*, Wilts.	7 A 16	0 27
18	Th	Ed. K. of W. Sax *Loughbro'* Leic. *Workſop*.	8 35	1 20
19	F	*Abbot's Bromley*, Stat. *Ruthin*, Denb. ☉ in	9 53	2 13
20	S	*Durh. Dolton*, Dev. [♈ 19. d. 15 h. 54'.	11 10	3 8
21	C	Oculi. 3 Sunday in Lent.	Morn.	4 3
22	M	*Downes*, Devon.	0 23	4 57
23	Tu	*Aylſham*, Norf. *Bodmin* Corn. *Skipt*. Yor.	1 28	5 57
24	W	*Llanerchemith* Caer. *Shirley St*. War. (*Faſt*.	2 23	6 53
25	Th	Annunc. Lady Day. Pr. EDWARD bor.	3 13	7 48
26	F	*Glouceſter*. *Namptwich*, Cheſh. *St. Albans*	3 52	8 44
27	S	*Atherſtone*, War. *Preſt*. Lan. *Woodbridge*.	4 26	9 35
28	C	Lætare. 4 S. in Lent. Midlent Sund.	4 56	10 17
29	M	*Stourbridge*, Worc. *Cobham*, Surrey, 28.	5 22	11 10
30	Tu	Days are now 12 hours and 40 m. long.	☽ Sets	11 59
31	W	*Durham*. laſts 3 days *Midhurſt*, Suſſex.	7 A 19	0 A 42

M D	☉ Riſes	☉ Sets	♄ Riſes	♃ Riſes	♂ Sets	♀ Sets	☿ Sets	Cl. faſt
1	5h 38'	5h 23	5 M 21	8 A 36	4 M 3	8 A 15	7 A 1	13' 12
6	6 28	5 33	5 4	8 15	3 50	8 32	6 30	12 11
11	6 18	5 43	4 48	7 53	3 37	8 49	Riſes	10 55
16	6 8	5 53	4 31	7 32	3 23	9 6	5 M 29	9 3
21	5 58	6 3	4 14	7 11	3 11	9 24	5 14	8 6
26	5 48	6 13	3 57	6 49	3 0	9 41	5 3	6 33

APRIL hath xxx Days.

First Quarter the 7 Day, 10 min. paſt 8 Night.
Full Moon the 15th, 41 m. paſt 1 Morning.
Laſt Quarter the 21ſt, 21 m. after 4 Afternoon.
New Moon the 29th, 36 m. paſt 8 Morning.

M D	⊙ Decl. North.	
1	3°	45
6	5	41
11	7	34
16	9	24
21	11	10
26	12	51

1	Th	All Fools Day. *Coventry*. *Sandwich*, K.	8 A	23	1 A	23
2	F	*Saliſbury*, Wilts. *Lutterworth*, Leic.	9	27	2	9
3	S	*Northampton*. *Chicheſter*, Suſſ. *Toceſter*.	10	28	2	53
4	C	Judica, 5 Sunday in Lent.	11	27	3	38
5	M	Old Lady D. *Huntingdon*. *Doncaſter*.	Morn.		4	26
6	Tu	*Epping*, Eſſex. *Rochford*, Eſſex.	0	20	5	15
7	W	*Atherſtone*, Warwickſh.	1	10	6	1
8	Th	Days increaſed 5 hours and half.	1	54	6	52
9	F	Days 13 hours 20 min. long.	2	34	7	43
10	S	*Alnwick*, Cumb.	3	8	8	35
11	C	Palm Sunday. 6 Sunday in Lent.	3	39	9	29
12	M	*Haltwhiſtle* Northum. *Hickfield*, Hamp.	4	7	10	23
13	Tu	*Aſhbourn*, Derb. *Budworth* Cheſ. *Orleton*.	4	35	11	13
14	W	Days now encreaſe very faſt.	5	3	Morn.	
15	Th	*Bewley*, Hampſhire.	☽ Riſes		0	6
16	F	*Dilton's Marſh*, Wilts. *Binbrooke*, Linc.	8 A	59	1	1
17	S	*Malmſbury* Wilts. (always on G. Fr.) *Faſt*.	10	16	1	58
18	C	EASTER DAY. Our SAV. Reſur.	11	26	2	57
19	M	Eaſter Monday.	Morn.		3	56
20	Tu	Eaſter Tueſday.	0	28	4	55
21	W	*Modbury*, Devonſh. *Rumney*. Kent.	1	21	5	52
22	Th	*Shrewſbury*. *Giſborough*, Yorkſh.	2	4	6	46
23	F	St. GEORGE. *Derby* *Northampton*.	2	39	7	40
24	S	*Lincoln*. *Cirenceſter*, Glou. *Orleton*, Heref.	3	8	8	27
25	C	Low Sunday. 1 Sunday after Eaſter.	3	35	9	15
26	M	Prince WILLIAM born. [St. MARK.	3	[illegible]	[illegible]0	1
27	Tu	*Boroughbridge*, Yorkſh. *Heldzeray*, Dev.	4	22	10	44
28	W	*Soham*, Cambr. *Aberforth*, Yorkſh.	4	45	11	29
29	Th	*Market Harbro'* Leic. *Newchurch*, Lanc.	☽ Sets		0 A	14
30	F	*Giſborough*, Yorkſhire.	8 A	27	0	58

M D	⊙ Riſes	⊙ Sets	♄ Riſes	⊙ Riſe	♃ Sets	♂ Riſes	♀ Riſes	Cl. faſt.
1	5 37	6 24	3 M 36	6 A 23	2 M 47	10 A 2	4 M 53	4 47
6	5 27	6 34	3 19	Set:	2 35	10 18	4 47	3 9
11	5 17	6 44	3 2	5 M 14	2 24	10 34	4 40	1 41
16	5 8	6 53	2 44	4 56	2 14	10 51	4 34	0 19
21	4 58	7 3	2 27	4 37	2 2	11 6	4 27	Slow.
26	4 49	7 12	2 8	4 18	1 49	11 18	4 21	2 0

MAY hath XXXI Days.

Firſt Quarter the 7 Day, 6 min. paſt Noon.
Full Moonthe 14th, 46 min. after 9 Morn.
Laſt Quarter the 21ſt, 23 min. paſt 1 Morning.
New Moonthe 28th, 58 min. aft. 11 at Night.

M D	☉ Decl. North.	
1	14	27
6	15	57
11	17	21
16	18	37
21	19	46
26	20	46

1	S	St.PH.&JAC. Ap.& M.*Totneſs. Wirkſ-*	9 A	27	1 A	42
2	C	2 Sunday after Eaſter. [*worth*	10	23	2	29
3	M	From Eaſter in 15 Days, 1. Ret. *Lancaſt.*	11	12	3	16
4	Tu	*Ampthill*, Bedf. *Bewdley*, Worc. *Ipſw.*	11	58	4	2
5	W	Term begins. *Monmouth. Boſton*, Linc.	Morn.		4	51
6	Th	*Abingdon*, Berks. *Kendal*, Weſtm.	0	39	5	40
7	F	*Bath*, Som. *Dunmow*, Eſſ. *Leek*, Staff.	1	13	6	30
8	S	*Philips-Norton*, Som.	1	46	7	20
9	C	3 Sunday after Eaſter.	2	15	8	5
10	M	From Eaſter in three Weeks, 2d Ret.	2	40	9	1
11	Tu	*Leiceſter. Dunſtable*, Bedf. *Crediton*, Dev.	3	8	9	57
12	W	Old May Day. *Penryn*, Cornwall.	3	35	10	52
13	Th	*Tiddeſwel*, Derb *Crouch*, Eſſ *Bala*, Meri.	4	5	11	47
14	F	*Wells*, Som. *Denbigh. Newark*, Notting.	☽ Riſes		Morn.	
15	S	*Bakewell*, Derb. *Chatham*, Kent.	9 A	11	0	45
16	C	4 Sunday after Eaſter.	10	19	1	45
17	M	From Eaſter in 1 Month, 3 Ret. *Aſhford.*	11	17	2	46
18	Tu	*Hateſbury*, Bucks. *Thunderly*, Eſſex.	Morn.		3	45
19	W	*Hereford. Rocheſter*, Kent. *Stratton*, Corn.	0	4	4	43
20	Th	*Galgarth*, Breckn. *Wickham*, Hants.	0	44	5	38
21	F	*Aſhburn*, Derb. *St. Tiddy*, Cornw.	1	16	6	29
22	S	*Abbots-Bromley*, Staff. *Greenſtreet*, Eſſ.	1	43	7	17
23	C	5 Sunday after Eaſt. Rogat. Sunday.	2	7	7	52
24	M	From Eaſt. in 5 Weeks, 4 Ret. P.F.W.b.	2	31	8	36
25	Tu	*Dagenham*, Eſſ. *Malmſbury*, Wilts.	2	53	9	28
26	W	Rogation Week. *Perthaethy*, Angleſea.	3	17	10	15
27	Th	Holy Thurſday, CHRIST's Aſcenſion.	3	44	10	55
28	F	On the Morrow of the Aſcen. 5 Return	☽ Sets		11	39
29	S	K. CHAR. II. Nat. and Ret. *Kanymyneck.*	8 A	16	0 A	25
30	C	Exaudi. 6 Sunday aft. Eaſter.	9	9	1	12
31	M	Term Ends. *Rocheſter. Workſop*, Nott.	9	56	2	1

M D	☉ Riſes		☉ Sets		♄ Riſes		♃ Sets		♂ Sets		♀ Sets		☿ Riſ.		Cl. ſlow.	
1	4^{h}	40	7	21	1 M	50	3 M	58	1 M	37	11 A	29	4 M	15	2′	49″
6	4	31	7	30	1	31	3	38	1	25	11	36	4	10	3	29
11	4	23	7	38	1	12	3	17	1	12	11	42	4	7	3	52
16	4	16	7	45	1	52	2	57	0	59	11	44	Sets		4	1
21	4	8	7	53	0	32	2	37	0	45	11	44	8 A	36	3	59
26	4	1	7	59	0	12	2	16	0	30	11	41	9	14	3	41

JUNE hath xxx Days.

Firſt Quarter the 6 Day, 44 m. bef. 1 in the Morn.
Full Moon the 12th, 36 min. paſt 4 Afternoon.
Laſt Quarter the 19th, 20 min. paſt Noon.
New Moon the 27th, 53 min. paſt 2 Afternoon.

M D	☉ Dec. North
1	
6	21 47
11	22 27
16	23 18
21	23 28
26	23 25

1	Tu	Nicom. Rom. Pr. & M. *Ruthin* Denb.	10 A 38	2 A 4
2	W	*Daventry*, Northam. *Market-Jew*, Corn.	11 14	3 37
3	Th	*Harſley-Green*, Lanc. *Kerby-Steph.* Weſt.	11 47	4 26
4	F	*St. Toſſels*, Cornw.	Morn.	5 15
5	S	Bonit. B. of Mentz, M. *Folkingham.* Faſt.	0 16	6 1
6	C	Whitſund. Deſc. of the Holy Ghoſt.	0 43	6 51
7	M	Whit-monday. *Southwell*, Nott.	1 7	7 42
8	Tu	Whit-Tueſday. *Newark upon Trent.*	1 33	8 33
9	W	Ember-Week. *Lenton*, near Notting.	2 0	9 27
10	Th	*Bingham*, Nott. *Cranbrook*, Kent.	2 32	10 25
11	F	St. BARNABAS A. & M. *Ameſbury* Wilts.	3 8	11 25
12	S	*Bartlow*, Eſſ. *Hadlow*, K. *Haverford Weſt.*	☽ Riſes	Morn.
13	C	Trinity Sunday.	9 A 0	0 25
14	M	On the Morrow of the H. Trin. 1 Ret.	9 53	1 28
15	Tu	*Ryſton*, Somerſetſhire.	10 37	2 26
16	W	*Wrexham*, Denb. *Milborn Port*, Som.	11 12	3 24
17	Th	S. Alban, M. *Bradford*, Wiltſhire.	11 43	4 18
18	F	Term begins.	Morn.	5 8
19	S	☉ in ♋ 20 d. 14 h. 56 min.	0 8	5 55
20	C	1 Sunday after Trinity.	0 31	6 41
21	M	In 8 Days of H. Trin. 2 Ret.	0 54	7 23
22	Tu	K. GEO. II. Inaug. *Appledore*, Kent.	1 18	8 4
23	W	*Armington*, Dev. *Folkingham*, Linc. Faſt.	1 42	8 45
24	Th	Nativ. of S. JOHN Bap. *Barnwell*, Cam.	2 10	9 31
25	F		2 41	10 21
26	S	K. GEO. II. Proc. 1727. *Chapel-Silvas*	3 16	11 4
27	C	2 Sunday after Trinity.	☽ Sets	11 49
28	M	From the D. of H. Tr. 15. D. 3. Ret. Faſt	8 A 32	A.
29	Tu	St. PETER Ap. & M. *Abbotſbury*, Dorſ.	9 11	1 28
30	W	*Bridgenorth*, Shropſhire.	9 45	2 16

M D	☉ Riſe	☉ Sets	♄ Riſes	♃ Sets	♂ Sets	♀ Sets	☿ Sets	Cl. ſlow
1	3h 55	8h 5	11 A 43	1 M 52	0 M 13	11 A 34	9 A 47	2 53
6	3 50	8 10	11 22	1 31	11 A 56	11 26	10 3	2 17
11	3 47	8 13	11 1	1 10	11 42	11 15	10 8	1 25
16	3 4	8 15	10 41	0 49	11 26	11 2	10 3	0 2
21	3 4	8 17	10 20	0 29	11 10	10 49	9 51	Faſt.
26	3 44	8 16	9 58	0 9	10 54	10 43	9 31	1 43

JULY hath XXXI Days.

Firſt Quarter the 5 Day, 14 min. paſt 9 Morn.
Full Moon the 11th, 23 min. paſt 11 at Night.
Laſt Quarter the 19th, 54 min. paſt 1 Morn.
New Moon the 27th, 10 min. after 5 Morn.

M D	☉ Decl North.	
1	23°	14'
6	22	55
11	22	26
16	21	45
21	20	55
26	19	57

1	Th	*Workſop*, Nott. *Hith*, Kent.	10 A	14	3 A.	7
2	F	Viſit of the B.V.M. *Hereford. Brecknock*	10	41	3	53
3	S	*Shrewſbury. Hadderſtone*, Hunt.	11	6	4	4
4	C	3 Sunday after Trinity.	11	32	5	33
5	M	Old Midſ. D. From D.H.T. 3 Weeks.	11	57	6	2
6	Tu	*Penryn*, Cornw. 7 Jno. Reyd. [4 Rec.	Morn.		7	15
7	W	Tho. a Becket. Trinity Term ends.	0	24	8	7
8	Th	*Folkeſtone*, Kent. *Machynleth.*	0	59	9	4
9	F	*Bromley*, Devonſh.	1	38	10	2
10	S	*Ailsford*, Dorſ. *Peterbo. Mt. Sorrel*, Leic.	2	24	11	[illegible]
11	C	4 Sunday after Trinity.	☽ Riſes		Morn.	
12	M	*Canterbury.* Kent. *Carſhalton*, Surry.	8 A	23	0	3
13	Tu	*Congleton*, Cheſh. *Huntingdon.*	9	3	1	4
14	W	Days ſhortened 22 Minutes.	9	37	2	1
15	Th	Swithun, B. of Wincheſt.	10	5	2	53
16	F	*Wincheſter.* Hampſh. *Polſtead*, Suff.	10	31	3	4
17	S	*Belt*, Breckn. *Lanibithew*, Denb. *Leek*, St.	10	55	4	3
18	C	5 Sunday after Trinity.	11	18	5	5
19	M	*Kenninghall*, Norfolk.	11	42	5	45
20	Tu	Marg. V. & M. *Helſtone*, Cornwall.	Morn.		6	40
21	W	*Alſreton*, Derb. *Swaffham*, Norfolk.	0	9	7	26
22	Th	S. Mary Magdalene. Pr. CA. MAT. bo.	0	39	8	12
23	F	*Honiton*, Dev. *Daventry.* Mattenſley, H	1	13	8	52
24	S	*Faringhay*, Kent. Faſt	1	52	9	44
25	C	6 S. after Trin. St. JAMES Ap. & M.	2	39	10	33
26	M	*Derby. Briſtol. Tamworth. Bedwin.*	3	31	11	22
27	Tu	*Headon*, Yorkſh. *Portſdown*, Hants.	☽ Sets		0 A	10
28	W	*Emlin*, Worceſt. *Fairford*, Glouceſt.	8 A	16	1	2
29	Th	Day 15 hours and half long.	8	44	1	49
30	F	*Caerleon*, Monm. *Linton*, Camb.	9	11	2	38
31	S	Dog Days begin. *Bowling*, Heref.	9	25	3	26

M D	☉ Riſes	☉ Sets	♄ Riſes	♃ Sets	♂ Sets	♀ Sets	☿ Sets	Cl. faſt.
1	3h 46'	8 15	9 A 37	11 A 44	10 A 38	10 A 1	9 A 7	2' 58
6	3 48	8 12	9 15	11 24	10 23	9 58	8 37	3 42
11	3 51	8 9	8 54	11 5	10 8	9 37	8 4	4 31
16	3 56	8 4	8 34	10 45	9 53	9 15	Riſes	5 12
21	4 1	7 59	8 14	10 26	9 38	8 52	3 M 55	5 41
26	4 8	7 52	7 53	9 7	9 23	8 27	3 21	5 56

AUGUST hath XXXI Days.

First Quarter 3 Day, 14 min. paſt 3 Afternoon.
Full Moon the 10th, 26 min. paſt 7 Morn.
Laſt Quarter the 17th, 2 min. before 6 Afternoon.
New Moon the 25th, 40 min. paſt 6 Afternoon.

M D	☉ Decl. North	
1	18°	36′
6	17	20
11	15	57
16	14	27
21	12	52
26	11	0

1	C	7 Sunday after Trin. Lam. Day.	10 A	0	4 A	14
2	M	*Wincheſter*, Hampſh. *Northwich*, Cheſh.	10	28	5	3
3	Tu	*Carnarvon*. *Daventry*, Northam. *Redruth*.	10	58	5	52
4	W	*Epſom*, Surry. *Ravenglaſs*, Cumb. *Thirſk*.	11	33	6	46
5	Th	*Doncaſter*, Yorkſh. *Stamford*, Linc.	Morn.		7	43
6	F	Transfig. of our Lord. *Paddington*, Mid.	0	17	8	42
7	S	Name of Jeſus. *Boſton*, Linc. *Falmouth*.	1	7	9	42
8	C	8 Sunday after Trinity.	2	8	10	43
9	M	*Llanwrſt*, Denb. *Shirkin*, Middleſex.	3	16	11	45
10	Tu	S. Laur. *Flint*. *Rugby*, Warw. *Thaxted* Eſſ.	☽ Riſes		Morn.	
11	W	*Newborough*, Angleſea. *Allchurch*, Her.	8 A	5	0	42
12	Th	Old Lammas Day. *Dunſtable*, Bedf.	8	32	1	34
13	F	*Northampton*. *Stow*, Suffolk.	8	58	2	23
14	S	Days decreaſed 1 hour and 3 quarters.	9	23	3	12
15	C	9 Sunday after Trinity.	9	48	3	55
16	M	*Aſhburn*, Derb. *Donnington*, Linc.	10	14	4	39
17	Tu	*Bardney*, Hampſhire,	10	42	5	25
18	W	Day 14 hours and half long.	11	15	6	11
19	Th	*Dartington*, Devonſhire.	11	53	6	57
20	F	*Doncaſter*, Yorkſhire (the 21ſt,)	Morn.		7	44
21	S	*Arundel*, Suſſ. *Horncaſtle*, Linc.	0	36	8	33
22	C	10 Sunday after Trinity.	1	26	9	22
23	M	*Belford*, Northum. *Dinton*, Oxf. Faſt.	2	22	10	9
24	Tu	St. BARTHOL. Ap. & M. *Monmouth*.	3	25	11	00
25	W	☉ Eclipſed, inviſible. *Milverton*, Som.	☽ Sets		11	49
26	Th	*Carliſle*, Cumb. *Huntingdon*.	7 A	19	0 A	39
27	F	*Coventry*, Warw. *Giſborough*, Yorkſh.	7	46	1	27
28	S	S. Au. B. *Ripley*, Yorkſhire.	8	11	2	14
29	C	11 Sunday after Trinity.	8	38	3	5
30	M	*Barham*, Suffolk, for Sheep and Lambs	9	7	3	54
31	Tu	Day 13 hours 42 min. long.		42	4	46

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Sets	♂ Sets	♀ Sets	☿ Riſes	Cl. faſt
1	4 17	7 43	4 M 9	9 A 45	9 A 4	7 A 53	2 M 54	5′ 54″
6	4 24	7 36	3 48	9 27	8 50	7 25	2 46	5 35
11	4 37	7 38	3 27	9 9	8 36	6 56	2 55	5 3
16	4 40	7 19	3 6	8 52	8 23	Riſes	3 18	4 16
21	4 49	7 10	2 46	8 35	8 9	4 M 47	3 50	3 17
26	4 58	7 1	2 26	8 18	7 56	4 15	4 3	2 3

SEPTEMBER hath xxx Days.

First Quarter the 1ſt Day, 13 min. paſt 9 Night.
Full Moon the 8th, 41 min. paſt 5 Afternoon.
Laſt Quarter the 16th, 12 min. after Noon.
New Moon the 24th, 9 min. paſt 7 Morn.

M D	☉ Decl. North.
1	9° 5
6	7 15
11	5 23
16	1 32
21	South
26	0 30

1	W	Giles, Abbot & Conf. *North-moor*, Wilts	10 A 20	5 A 43
2	Th	*Richmond Rood*, North.	11 7	6 42
3	F	*Brecknock*, and five following Days.	Morn.	7 38
4	S	*Bartholomew*, Lond. *Dover*, Kent.	0 3	8 37
5	C	12 Sunday after Trinity.	1 8	9 37
6	M	*Folkingham*, Linc. *Snaith*, Yorkſh.	2 19	10 34
7	Tu	Enurchus, B. of Orleans.	3 33	11 31
8	W	Nativ. of the B. V. M. *Workſworth*, Derb	☽ Riſes	Morn
9	Th	Dog Days end. *Biſhops-Caſtle*, Shropſh.	7 A 5	0 20
10	F	Days decreaſed 3 hours and half.	7 30	1 10
11	S	*Tallowdown*, Dorſetſhire.	7 56	1 56
12	C	13 Sunday after Trinity. [Glouc.	8 22	2 41
13	M	*Newton*, Lan. *Tregony*, Corn. *Iron Acton*	8 50	3 25
14	Tu	Holy Croſs D. *Woburn*, Bedf. *Barſly*, K.	9 20	4 11
15	W	Ember Week.	9 57	4 57
16	Th	*Lutterworth*, Leic. *Newcaſtle*, Staff.	10 38	5 43
17	F	Lambert, Biſh. & M. *Probus* Cornw.	11 24	6 31
18	S	*Southwark*. *Maſham*, Yorkſh. *Wicks*, Eſſ.	Morn.	7 20
19	C	14 Sunday after Trinity.	0 19	8 7
20	M	*Mancheſter*, Lanc. *Giſborough*, Y. Faſt.	1 18	8 56
21	Tu	St. MATTHEW, Ap. Ev. and Mart.	2 22	9 46
22	W	☉ in ♎ 4 h. 26 *Allchurch*, Worceſt	3 31	10 36
23	Th	*Halkin*, Wilts. *Paincaſtle*, Radnor.	4 42	11 30
24	F	*Wickware*, Glouc. *Ledwyn*, Glam.	☽ Sets	0 A 21
25	S	*Bakewell* and *Cheſterfield*, Derb.	6 A 48	1 13
26	C	15 Sunday after Trin.	7 17	2 3
27	M	*Clapham*, Yorkſh. *Northall*, Middleſex	7 50	2 55
28	Tu	*Glouceſter*. *Tuxford*, Nottinghamſh.	8 29	3 46
29	W	St. MICH. and all Angels *Wallingf*. Be.	9 13	4 45
30	Th	S Jer. Pr. Conf. & Doct. *Wrexham* Denb.	10 7	5 54

M. D.	☉ Riſe	☉ Set	♄ Sets	♃ Sets	♂ Sets	♀ Sets	☿ Riſes	W. ſlow.
1	5h 10	6h 49	2 M 2	7 A 58	7 A 40	3 M 35	7 A 0	0′ 22″
6	5 19	6 40	1 42	7 42	7 28	3 15	6 55	1 12
11	5 29	6 30	1 22	7 26	7 14	2 55	6 49	2 50
16	5 40	6 20	1 3	7 9	7 2	2 40	6 41	4 34
21	5 59	6 0	0 45	6 53	6 50	2 30	6 33	6 19
26	6 [illegible]	5 [illegible]	0 27	6 36	6 38	2 [illegible]	6 23	8 1

OCTOBER hath XXXI Days.

	M D	☉ D.cl. North	
Firſt Quarter the 1 Day, 2 min. before 3 Morn.	1	2°	46'
Full Moon the 8th, 39 min. after 6 Morn.	6	4	19
Laſt Quarter the 16th, 3 quarters paſt 7 Morn.	11	6	15
New Moon the 23d, 35 min. paſt 6 at Night.	16	8	8
Firſt Quarter the 30th, 27 min. paſt 10 Morn.	21	9	58
	26	11	45

1	F	Remig. B. of Rhemes. *Sheffnal*, Shrop.	11 A	8	6 A	45
2	S	*Shrewſbury*, Shrop. *Dover*, K. *Reading*, B.	Morn.		7	38
3	C	16 Sunday after Trinity.	0	15	8	33
4	M	*Penkridge*, Staffordſhire.	1	27	9	22
5	Tu	*Llanvilling*, Montg. *Lamport* Som.	2	41	10	19
6	W	Faith, Virgin and Mart. *Hull* Yorkſh.	3	54	11	7
7	Th	*Billericay*, Eſſex. *Counteſs Court*, Wilts.	5	3	11	55
8	F	*Abingdon*, Berks. *Challock*, Kent.	☽ Riſes		Morn.	
9	S	St. Denys Areop. B. & M. *Lancaſter*.	6 A	31	0	41
10	C	17 Sund. aft. Trin. Old Mich. Day.	6	59	1	25
11	M	*Leiceſter* St. *Albans*, Herf. *Bedal*, York.	7	27	2	10
12	Tu	*Banbury*, Oxf. *Caſtor*, Linc. *Se'nokes*, K.	8	1	2	56
13	W	Tranſl. of K. Ed. Conf. *Devizes*, Wilts	8	40	3	42
14	Th	*Buttonmoor*, Shrop. *Workſop*, Notting	9	24	4	30
15	F	*Falſely*, Warwickſhire.	10	14	5	20
16	S	*Boſworth*, Leic. *Hay*, Brecknockſh.	11	11	6	7
17	C	18 Sunday after Trin. Etheldred V.	Morn.		6	55
18	M	St. LUKE the Evang. *Cank*, Staff.	0	14	7	49
19	Tu	*Oxford*. *Market Harbro'*, Leic.	1	20	8	37
20	W	*Aſhborn*, Derb. *Hereford*. *Blythe*, Nott.	2	28	9	23
21	Th	*Gainſborough*, Linc. *Downes*, Cornw.	3	39	10	11
22	F	K. GEO. II crown'd. *Wells*, Som.	4	54	11	4
23	S	*Ripley*, Derb. *Stockport*, Cheſh.	☽ Sets		11	58
24	C	19 Sunday after Trinity.	5 A	54	0 A	51
25	M	Criſpin Mart. *Queens Camel*, Som.	6	31	1	46
26	Tu	*Grantham*, Linc. *Chepſtow*, Monm.	7	13	2	42
27	W	*Appletreewick*, Yorkſh. Faſt.	8	9	3	32
28	Th	St. SIM. & St. JUDE A & M, *Bingham*.	9	4	4	39
29	F	*Newcaſtle upon Tyne*, Wm. Richardſon	10	11	5	40
30	S	*Banbury*, Oxf. *Ely*, Cambr. Faſt	11	22	6	35
31	C	20 Sund. aft. Trin. *Belper*. Derb.	Morn.		7	30

M D	☉ Riſes		☉ Sets		♄ Sets		♃ Sets		♂ Sets		☿ Riſes		♀ Set		Cl. ſlow.	
1	6h	11	5h	48	0 M	9	6 A	20	6 A	26	2 M	18	6 A	14	0'	1"
6	6	18	5	41	11 A	57	6	4	6	15	2	16	6	5	11	1
11	6	28	5	31	11	29	5	48	6	3	2	19	5	57	12	42
16	6	38	5	21	11	11	5	32	5	51	2	22	5	47	3	54
21	6	47	5	12	10	52	Riſes		5	39	2	29	5	36	14	55
26	6	57	5	2	10	34	6 M	39	5	28	2	36	[illegible]	2	5	40

NOVEMBER hath xxx Days.

Full Moon the 6 Day, 18 min. paſt 10 Night.
Laſt Quarter the 15th, 4 min. paſt 3 Morn.
New Moon the 22d, 11 min. after 5 Morn.
Firſt Quarter the 28th, 34 min. paſt 8 Night.

M D	☉ Decl. South	
1	13°	48
6	15	24
11	16	53
16	18	16
21	19	30
26	20	35

1	M	All Saints Day.	o Set	35	8 A	19
2	Tu	Prs. of ORANGE born. All Souls.	1 M	48	9	10
3	W	On the Morrow of all Souls.	2	58	9	55
4	Th	*Appleſham*, Hants.	4	7	10	39
5	F	Papiſts Conſpiracy. *Beverley*, York.	5	16	11	23
6	S	Leonard, Confeſſor. Term begins.	☽ Riſes		Morn.	
7	C	21 Sunday after Trinity.	5 A	31	0	9
8	M	*Hertford. Colcheſter*, Eſſ. *Aſhby*. Leic.	6	2	0	54
9	Tu	*Darlington*, Durh. *Stamford*, Linc.	6	38	1	40
10	W	K. GEO. II born. *Lenton*, Nott.	7	20	2	28
11	Th	St. Martin. Biſh. & Conf. *Liverpool*.	8	8	3	16
12	F	On the Morrow of Saint Martin.	9	1	4	4
13	S	Britius, Biſh. *Huntingdon*, Heref.	9	58	4	52
14	C	22 Sunday after Trinity.	11	2	5	40
15	M	Machutus, Biſh.	Morn.		6	26
16	Tu	*Andover*, Hampſh. *Launceſton*, Cornw.	0	8	7	16
17	W	Hugh, Biſh. of Linc. *Sheffield*, Yorkſh.	1	16	8	4
18	Th	In eight Days of Saint Martin.	2	26	8	53
19	F	*Woodcot*, Oxf. *Yarme*, Yorkſh.	3	41	9	42
20	S	Edmund King & Mart. *Lynn*, Norf.	4	58	10	35
21	C	23 Sunday after Trinity.	6	17	11	29
22	M	Cecilia V. & M. *York. Monmouth. Dover*.	☽ Sets		0 A	26
23	Tu	S. Clem. I. B. of R. & M. *Hide*, Eſſex.	5 A	48	1	25
24	W	Day 8 hours 28 min. long.	6	47	2	26
25	Th	Pr. WIL. HEN. born. *Cheſterfield*, Derb.	7	53	3	27
26	F	In 15 Days of St. Martin.	9	5	4	25
27	S	*Littlebury*, Eſſex.	10	18	5	23
28	C	Advent Sunday.	11	31	6	15
29	M	Term Ends, *Aſhburn*, Derb. Faſt.	Morn.		7	9
30	Tu	St. AND. Ap. Prs. Dow. of WALES b.	0	42	7	49

M D	☉ Riſes		☉ Sets		♄ Set		♃ Riſes		♂ Set		☿ Riſes		♀ Sets		Cl. ſlow.	
1	7h	9	4h	50	10 A	11	5 M	23	5 A	14	2 M	44	5 A	2	16′	8′
6	7	18	4	41	9	52	5	9	5	3	2	53	Riſes		16	13
11	7	26	4	33	9	34	[illegible]	55	4	52	3	3	6 M	32	15	57
16	7	34	4	25	9	15	[illegible]	40	4	43	3	13	5	54	15	17
21	7	42	4	18	8	57	[illegible]	25	4	3[illegible]	3	22	5	43	14	20
26	7	49	4	11	8	38	[illegible]	10	4	2[illegible]	3	22	5	[illegible]	[illegible]	0

DECEMBER hath XXXI Days.

Full Moon the 6 Day, 20 min. paſt 4 Afternoon.
Laſt Quarter the 14th, 24 min. paſt 8 at Night.
New Moon the 21ſt, half paſt 3 Afternoon.
Firſt Quarter the 28th, 3 quarters paſt 9 Morn.

M D	☉ Decl. South.
1	21° 31′
6	22 17
11	22 30
16	23 15
21	23 29
26	23 26

1	W	*Rotherham*, Yorkſh. *Sutton*, Kent. *Hithe*.	1 M 51	8 A 34
2	Th	*Hoxne*, Suffolk.	3 0	9 16
3	F	*Pennyfont*, Somerſetſhire.	4 7	10 1
4	S	*Atherſtone*, Warw. *Thirſk*, Yorkſh.	5 11	10 44
5	C	2 Sunday in Advent.	6 14	11 30
6	M	Nicol. Biſh. of Myra in Lycia.	☽ Riſes	Morn.
7	Tu	Days decreaſed 8 hours 34 min.	5 A 9	0 17
8	W	Concept. of the B. V. M.	5 53	1 4
9	Th	*Bradford*, Wilts.	6 44	1 51
10	F	*Kimbolton*, Hunt. *Newport*, Shropſh.	7 41	2 39
11	S	*Rocheſter*, Kent. *Preſton*, Lanc.	8 41	3 26
12	C	3 Sunday in Advent.	9 43	4 14
13	M	Lucy, Virgin & Mart. *Ameſbury*, J. D.	10 49	5 00
14	Tu	Day 7 hours 42 min long.	11 56	5 42
15	W	Ember Week.	Morn.	6 30
16	Th	O Sapientia.	1 7	7 19
17	F	*Exeter*, Devon. *Grantham*, Linc.	2 20	8 8
18	S	*Spalding*, Linc.	3 37	9 00
19	C	4 Sunday in Advent.	4 53	9 56
20	M	☉ in ♑ 19 h. 58 min.	6 12	10 53
21	Tu	St. THOMAS Ap. & M. *Penryn*, Corn.	☽ Sets	11 56
22	W	*Newport Keams*, Montg.	5 A 16	0 A 57
23	Th	Greateſt dec. of D. at NOTT. 9 h. 25 m.	6 27	1 39
24	F	at LONDON 8 hours 50 min. Faſt.	7 44	2 58
25	S	CHRISTMAS-DAY.	9 1	3 53
26	C	1 Sund. aft. Chriſtm. St. Steph. 1ſt M.	10 14	4 46
27	M	St. John. Ap. & Ev.	11 26	5 35
28	Tu	Innocents Day.	Morn.	6 20
29	W	*Lockhill*, Som.	0 37	7 3
30	Th	*Maiden Bradley*, Wilts.	1 44	7 46
31	F	Silveſter Biſh. of Rome.	2 48	8 30

M D	☉ Riſes	☉ Sets	♄ Sets	♃ Riſes	♂ Riſes	♀ Sets	☿ Riſes	Cl. ſlow.
1	7h 54′	4h 6	8 A 19	4 M 54	4 A 11	3 M 43	6 M 8	11′ 0
6	8 0	4 0	8 0	4 38	4 2	3 55	6 26	9 25
11	8 4	3 56	7 40	4 22	3 54	4 6	6 49	7 16
16	8 6	3 54	7 21	4 5	Riſes	4 17	7 16	4 55
21	8 8	3 52	7 1	3 48	8 M 6	4 28	7 30	2 16
26	8 5	3 55	6 42	3 30	8 1	4 39	7 49	3 Faſt 2

A TABLE of all the KINGS and QUEENS of *England* ſince the Conqueſt.

The Year of the Birth of each King and Queen; alſo the Year, Month, and Day, whereon they began to reign: beginning the Year the firſt Day of January, 1756.					The Length of each Reign.			The Years expired ſince each Reign began and ended.	
Names.	Born.	Began to Reign.			Y.	M.	D.	Beg	End
William Conq.	1027	1066	October	14	20	10	26	690	669
William Rufus	1057	1087	Septem.	9	12	10	24	669	656
Henry I.	1058	1100	Auguſt	2	35	4	0	656	621
Stephen	1105	1135	Decem.	1	18	10	24	621	602
Henry II.	1134	1154	October	25	34	8	11	602	567
Richard I.	1156	1189	July	6	9	9	0	567	557
John	1166	1199	April	6	17	6	13	557	540
Henry III.	1207	1216	October	19	56	1	0	540	484
Edward I.	1239	1272	Novem.	16	34	7	21	484	449
Edward II.	1284	1307	July	7	19	6	13	449	429
Edward III.	1312	1327	January	20	50	5	1	429	379
Richard II.	1366	1377	June	21	22	3	8	379	357
Henry IV.	1367	1399	Septem.	29	13	5	21	357	343
Henry V.	1389	1413	March	20	9	5	11	343	333
Henry VI.	1421	1422	Auguſt	31	38	6	4	334	294
Edward IV.	1442	1461	March	4	22	1	5	295	273
Edward V.	1471	1483	April	9	0	2	13	273	273
Richard III.	1443	1483	June	22	2	2	0	273	271
Henry VII.	1457	1485	Auguſt	22	23	8	0	261	247
Henry VIII.	1492	1509	April	22	37	9	6	247	209
Edward VI.	1537	1547	January	28	6	5	8	209	209
Mary I.	1516	1553	July	6	5	4	11	203	198
Elizabeth	1533	1558	Novem.	17	44	4	7	198	153
James I.	1566	1603	March	24	22	0	3	153	131
Charles I.	1600	1625	March	27	23	10	3	131	107
Charles II.	1630	1649	January	30	36	0	7	107	71
James II.	1633	1685	February	6	4	0	7	71	67
William III.	1662	1689	Feb.	13	5	10	15	67	62
Mary II.	1650				13	0	23	67	54
Anne	1665	1702	March	8	12	4	24	54	42
George I.	1660	1714	Auguſt	1	12	10	10	42	29
George II.	1683	1727	June	11	whom God preſerve.				

A Compendious TABLE of INTEREST,

Shewing the Intereſt of any Sum of Money, from a Million to a Pound; for any Number of Days, at any Rate of Intereſt.

Nº.	l.	s.	d.	q.		Nº.	l.	s.	d.	q.	
1000000—	2739	14	6	0	,99	1000—	2	14	9	2	,14
900000—	2465	15	0	3	,29	900—	2	9	3	3	,12
800000—	2191	15	7	1	,59	800—	2	3	10	0	,11
700000—	1917	16	1	3	,89	700—	1	18	4	1	,10
600000—	1643	16	8	2	,19	600—	1	12	10	2	,80
500000—	1369	17	3	0	,49	500—	1	7	5	3	,70
400000—	1095	17	9	2	,79	400—	1	1	11	0	,50
300000—	821	18	4	1	,09	300—	0	16	5	1	,40
200000—	547	18	10	3	,40	200—	0	10	11	2	,30
100000—	273	19	5	1	,70	100—	0	5	5	3	,01
90000—	246	11	6	0	,32	90—	0	4	11	0	,71
80000—	219	3	6	0	,96	80—	0	4	4	2	,41
70000—	191	15	7	1	,59	70—	0	3	10	0	,11
60000—	164	7	8	0	,22	60—	0	3	3	1	,81
50000—	136	19	8	2	,85	50—	0	2	8	3	,51
40000—	109	11	9	1	,48	40—	0	2	2	1	,21
30000—	84	3	10	0	,11	30—	0	1	7	0	,90
20000—	54	15	10	2	,74	20—	0	1	1	0	,60
10000—	27	7	11	1	,37	10—	0	0	6	2	.30
9000—	24	13	1	3	,23	9—	0	0	5	3	,67
8000—	21	18	4	1	,10	8—	0	0	5	1	,40
7000—	19	3	6	2	,96	7—	0	0	4	2	,41
6000—	16	8	9	0	,82	6—	0	0	3	3	,76
5000—	13	13	11	2	,58	5—	0	0	3	1	,15
4000—	10	19	2	0	,55	4—	0	0	2	2	,52
3000—	8	4	4	2	,41	3—	0	0	1	3	,80
2000—	5	9	7	0	,27	2—	0	0	1	1	,26
1000—	2	14	9	2	.14	1—	0	0	0	2	,63

RULE.

Multiply the Sum by the Number of Days; and that Product by the Rate per Cent. Then cut off the two laſt Figures to the Right Hand, and the reſt you muſt find in the Table.

Example, What is the Intereſt of 100 l. for 365 Days at 5 per Cent.

Nº. of Days 365
multiply by 100
Product 36500
multiply by 5 Rate p. Cent.
1825|00

Then in the Table
againſt 1000 is 2 14 9 2 ,14
800 2 3 10 0 ,11
20 0 1 1 0 ,60
5 0 0 3 1 ,15
Anſw. 5 0 00 ,00

THIS Year there will be only two Eclipſes, both of the *Sun*, and inviſible; of which Mr. *Lionel Charlton*, and other of our *Contributors*, have ſent us the Times as follows, *viz.*

Monday, *March* 1, at 2 in the Morning.
Wedneſday, *Aug.* 25, at 7 in the Afternoon.

The ſaid *Lionel Charlton* alſo obſerves, that there will be a very remarkable Tranſit of the Planet *Mercury* over the *Sun's* Diſk, on the 7th of *November* in the Morning; and ſays, that the Inhabitants of *Aſia*, particularly of the *Eaſt Indies* and *China*, may (by the Aſſiſtance of *Teleſcopes*) ſee *Mercury* approach within leſs than a Minute of the *Sun's* Centre; a Phænomenon, which will not happen again for ſeveral Centuries to come.

WE ſhould be very glad to find *all* our CONTRIBUTORS ſo honeſt, as to ſend *us* their *own* Performances; and not to *ſteal* ÆNIGMAS, or any other SUBJECTS whatſoever. Can it be ſuppoſed that the AUTHORS have read every thing that has been publiſhed? Or, if they had; Can it be expected, that they remember *all* that they read? We looked upon the ſecond *Ænigma* laſt Year to be a *very good one*; and had no Suſpicion of its being *ſtolen* from the LADIES DIARY in 1727; therefore hope *we* ſhall not be found deſerving of publick Cenſure on that Account; for whoever ſhall be found guilty of ſuch Practices for the future, we ſhall not fail expoſing them to the World.

WE gave a *Hint*, much to the ſame Purpoſe in the laſt Year's DIARY (Page 34.) and further deſired (as we do ſtill) that all our CONTRIBUTORS, in their Solutions to the Mathematical Queſtions, will ſend their *Schemes* as perfectly drawn as poſſible; and alſo of a *Size* proper for the DIARY: and likewiſe to bring out all their Equations in Numbers, in order to facilitate the Labour of the AUTHORS, in collecting and compiling the Work, &c.

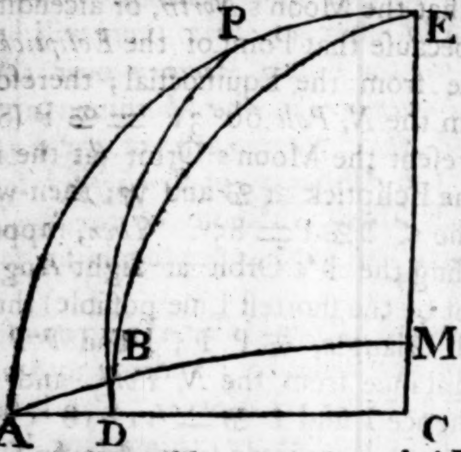
We return Thanks to *Engliſh Tom*, for what he favoured us with the laſt Year; but, as he muſt be ſenſible, that *Solutions* are always expected, along with whatever is *propoſed* by our CONTRIBUTORS; he (and all others,) may reaſonably expect that we ſhall (with Pleaſure) make it our Endeavour to oblige them as far as we have Room, &c. but deſire to acquaint them, that they muſt not expect to have any thing publiſhed but what they ſend Solutions to.

N. B. Mr. *Randle's* Queſtion was publiſhed in the *Univerſal Magazine* for *May* laſt.

Anſwers to the QUESTIONS in laſt Year's *Diary*.

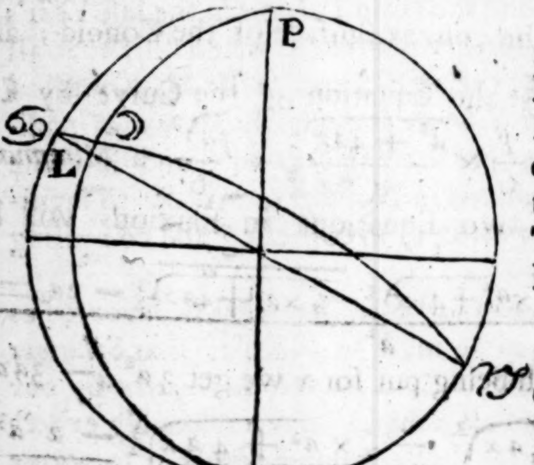
1 Queſtion (141) anſw. by Mr. *Thomas Garrard*, of *Ipſwich*.

LET APE repreſent the *Solſtitial Colure*; ADC the *Ecliptick*; ABM the *Moon's Orbit*; P the *North Pole*; and E, that of the Ecliptick: Then it is evident the neareſt Approach of the *Moon* to the *North Pole*, when her Aſcending Node is in *Cancer*, will be at B, where the *Meridian* BP, cuts the *Moon's Orbit* at right Angles, which being premiſed: In the Right angled ſpherical Triangle ABP, is given $AP = 66^\circ\ 31'$, and the Angle $PAB = 85^\circ$, whence we get $PB = 66^\circ\ 01'\ 11''$, and $AB = 11^\circ\ 20'\ 36''$. Now, in the right angled ſpherical Triangle ABD, is known $AB = 11^\circ\ 20'\ 36''$; and the Angle $BAD = 5^\circ$, whence we have $BD = 0^\circ\ 58'\ 56''$ = the Moon's Latitude; and $AD = 11^\circ\ 18'\ 04''$ = her Longitude from *Cancer*; to which, adding 90° we have $101^\circ\ 18'\ 04''$, her Longitude from *Aries*.



Mr. *L. Charlton*, anſwers it thus:

IT is evident, that this muſt happen, when the Place of the *aſcending Node* is in the Beginning of *Cancer*: Therefore in the right angled ſpherical Triangle P ☽ ♋, having $P♋ = 66^\circ\ 31'$. And the $\angle ♋ = 85$; it is eaſy to find $☽♋ = 11^\circ\ 21'$, conſequently the Moon's Place is ♋ 11° 18′, and Latitude 0° 59′ *N. A.*



The ſame anſwer'd by Mr *Charles Wildbore* of *Nottingham*.

Who obſerves as above (ſee the laſt Fig.) puts P to repreſent the Pole; ♋ and ☽ their reſpective Angles; then in the Right angled ſpherical Triangle P ☽ ♋, is given $P♋ = 66^\circ\ 31'$, and the $\angle ♋\ 85^\circ$, to find ♋ ☽. And in the $\triangle$ ♋ ☽ L, is given ♋☽ = 11° 22′; and the < L♋☽ L♋☽ = 5°; to find ♋L = 11° 23′ = the ☽'s Longitude from ♋: And ☽L = 0° 59′, its Latitude.

Mr. *Sam. Bamfield*, of *Honiton* in *Devonſhire*, ſends us the following Solution to the ſame Queſtion; thus:

It is extremely obvious, that the Moon's *North*, or aſcending Node muſt be in *Cancer*, becauſe that Point of the *Ecliptick* is the fartheſt poſſible Diſtance from the Equinoctial; therefore the ☽'s Node is diſtant from the *N. Pole* 66° 31′ = ♋P (See Fig. 2.) Let ♋☽♑, repreſent the Moon's Orbit (at the required Time) interſecting the Ecliptick at ♋ and ♑; then will the < ♑♋☽ = 5°. ∴ the < ☽♋P = 85°. *Then*, ſuppoſe ☽P to be a Meridian croſſing the ☽'s Orbit at right Angles (which of Conſequence muſt be the ſhorteſt Line poſſible) then, in the rectangled ſpherical Triangle, ♋P☽; I find ☽P = 66° 1′ 12″ = the Moon's diſtance from the *N. Pole*; and ♋☽ = 11° 20′ 36″. And thence I find L♋ = 11° 18′ 5″ = her Longitude from *Cancer*: the Longitude from *Aries* = 101° 18′ 5″. And, laſtly I find L☽ = 0° 58′ 56″, her Latitude; which was required.

We received ſeveral good Anſwers from our Contributors (See the Catalogue.)

2 Queſtion (142) by Mr *William Bevil* of *Harpſwell.*

Let x = Abſciſſa, y = Ordinate, $p = 3,1416$; then $\frac{p}{6a} \times \overline{a^{2}+4y^{2}}^{\frac{3}{2}} - \frac{pa^{2}}{6}$ = the convex Surface of the Conoid; alſo $\frac{pxy^{4}}{2} = s$, and $ax = y^{2}$ the Equation of the Curve by Expunge $-y^{2}$, we have $\frac{p}{6} \times \overline{\frac{a^{2}+4ax}{a}}^{\frac{3}{2}} - \frac{\overline{pa}^{2}}{6}$ a *Minimum*; and $\frac{pax^{2}}{2} = s$. Theſe two Equations in Fluxions will be

$$\frac{\overline{3a^{2}\dot{a}+6a^{2}\dot{x}+6a\dot{a}x} \times \overline{a^{2}+4ax}^{\frac{1}{2}} - \dot{a} \times \overline{a^{2}+4ax}^{\frac{3}{2}} - 2a\dot{a}}{a^{2}} = 0,$$

and $\dot{x} = \frac{-\dot{a}x}{2a}$; which being put for $\dot{x}$ we get $3a^{2}\dot{a} - 3a\dot{a}x + 6a\dot{a}x \times \overline{a^{2}+4ax}^{\frac{1}{2}} - \dot{a} \times \overline{a^{2}+4ax}^{\frac{3}{2}} - 2a^{3}\dot{a} = 0$. Or $3a^{2}+3ax \times \overline{a^{2}+4ax}^{\frac{1}{2}} - \overline{a^{2}+4ax}^{\frac{3}{2}} - 2a^{3} = 0$. Therefore $12a^{2} - 15ax + 4x^{2} = 0$: But ſince $a = \frac{2s}{px^{2}}$, we have $48s^{2} - 30spx^{3} + 4p^{2}x^{6} = 0$. $\therefore x^{3} = \frac{15s}{4p} \pm \frac{s}{4p}\sqrt{33}$. Or $x^{3} = \frac{s}{4p} \times 15 \pm \sqrt{33}$.

Whence $x = ,903084\sqrt[3]{s}$. Hence $y = ,839605\sqrt[3]{s}$. Q. E. D.

The ſame anſwered by Mr. *Tho. Garrard.*

Put $p = 3,14159$, the Circumference of a Circle whoſe Diameter is Unity; d, the convex Superficies; and s, the Solidity of the common *parabolic Conoid*; x any variable Abſciſſa, y its correſpondent Semi-ordinate; and a, the Perimeter of its generating Parabola. Then, by the Nature of the Curve, $ax = yy \therefore \dot{s} = p\dot{x}yy = pa\dot{x}x \therefore s = \frac{1}{2}paxa = \frac{1}{2}\frac{py^4}{a}$; Again $\dot{d} = 2py\sqrt{\dot{x}\dot{x}+\dot{y}\dot{y}} = \frac{2p\dot{y}y}{a}\times\overline{aa+4yy}|^{\frac{1}{2}}$, whoſe Fluent corrected is $D = \frac{p}{6a}\times\overline{aa+4yy}|^{\frac{3}{2}} - \frac{paa}{6}$; $\therefore \frac{a}{1}\times\overline{aa+4yy}|^{\frac{3}{2}} - aa$, is a *Minimum*: or writing v^6 for a, and c for $\sqrt{\frac{s}{2p}} = \frac{\frac{1}{2}yy}{\sqrt{a}}$, we have $v^8 - \overline{\frac{8c}{v}}|^{\frac{3}{2}} - v^{12}$ a *Minimum*, which *Fluxed* and *Reduced*, gives $v^{18} - \frac{5c}{2}v^9 = -\frac{4}{3}cc$; and reſtoring the Values of v^6 and c, we have $a^3 - \frac{5}{2}\sqrt{\frac{s}{2p}}\times a^{\frac{3}{2}} = -\frac{8s}{12p}$; and compleating the Square, &c. $a^{\frac{3}{2}} = \frac{5}{4}\sqrt{\frac{s}{2p}} + \sqrt{\frac{11s}{96p}} =, 68965704$, when $s =$, Unity; whence $a = 0,7805884$, $x = 0,9030858$, and $y = 0,8396060$, Now, becauſe the Solidity of all ſimilar Solids, are as the Cubes of their like Sides; it is evident (from the above) that when the Superficies of the *parabolic Conoid* is a *Minimum*, the *Perimeter*, *Abſciſſa*, and *Semi Ordinate* of its generating Parabola, will always be = the Cube Root of the Conoid's Solidity, multiplied by thoſe Numbers reſpectively.

Mr. *Zach. Gaſkell* anſwers it as follows.

Firſt, we have by the Doctrine of FLUXIONS (putting $a =$ Param. and $c = 3,141592$, &c.) $\frac{c}{ba}\times\overline{aa+4yy}|^{\frac{3}{2}} - \frac{caa}{b} =$ to the convex Surface: and the *Fluxion* of the Solidity $= \frac{2cy^3\dot{y}}{a}$, whoſe Fluent $\frac{cy^4}{2a} = s$; whence $ba = \frac{3cy^4}{s}$; and $aa = \frac{c^2y^8}{4s^2}$. Put *theſe* reſpectively for their *Values* in the above Expreſſion, and after due Regulation it will become, $-\frac{1}{y^4} \times \overline{\frac{c^2 y^8}{4ss}+4yy}^{\frac{3}{2}} - \frac{c^3 y^8}{8s^2}$; which is to be a *Minimum*: This in *Fluxions* and reduced, gives $\frac{5s^2}{c^2} - y^b$ $y^{12} = \frac{b4s^4}{12c^4}$ ſolv'd $y^b = \frac{3{,}457427 1077}{c^2}\,s^2$; whence $y = \sqrt[b]{\frac{3\,457271077}{c^2}} \times \sqrt[3]{s} = 0{,}83960602\,s^{\frac{1}{3}}$: And from the Equation $\frac{cyyx}{2} = 5$, $x = c \times \overline{\frac{2s^{\frac{1}{3}}}{,83960602}}^{2} =,90308582\,s^{\frac{1}{3}}$ as were inſiſted on.

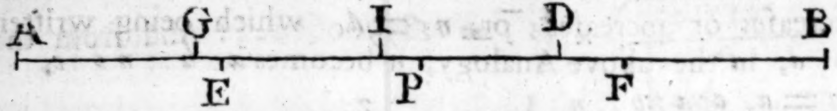
Mr. *Sam. Bamfield's* Solution to the ſame.

Put a = Parameter, $p = 3{,}1416$, and s = the Conoids Solidity (= 1) *per Simpſon*, p. 131. $\frac{\overline{aa+4yy}^{\frac{3}{2}} - a^3}{a} \times \frac{p}{3}$ = the convex Surface; *per* Property of the Figure, $4yy^2 = 4ax = 4a\sqrt{\frac{2s}{pa}} = \sqrt{\frac{32sa}{p}}$; which make $= na^{\frac{1}{2}}$, and $z^2 = a$; then,— the Expreſſion for the *Minimum* will ſtand thus, $\frac{\overline{z^4+nz}^{\frac{3}{2}}}{z^2} - z^4$ $\left(\frac{p}{3}\right)$ being conſtant. In Fluxions $\overline{6z^5\dot{z} + \frac{3}{2}nz^2\dot{z}} \times \sqrt{z^4+nz}, - 2z\dot{z} \times \overline{z^4+nz}^{\frac{3}{2}} - 4z^7\dot{z} = 0$; Reduced, $-3z^6 + \frac{15}{16}nz^3 - \frac{1}{16}nn = 0$. *Per* Reſtitution $-3a^3 + \frac{15}{16}\sqrt{\frac{32s}{p}}\,a^{\frac{3}{2}} = \frac{2s}{p}$; which Quadratic ſolved, $a =,7805786$ accurately; hence the Abſciſſa $=,9030904$, and Semi-ordinate $=,8396029$: Whence theſe Numbers are the general Proportion for the *Axis* and *Semi-ordinate* of all ſuch like *Conoids* as are comprized under the leaſt Surface poſſible. In like Manner as a Cone, under the leaſt Superficies, hath it's Baſe to its Altitude, as 1 to $\sqrt{2}$.

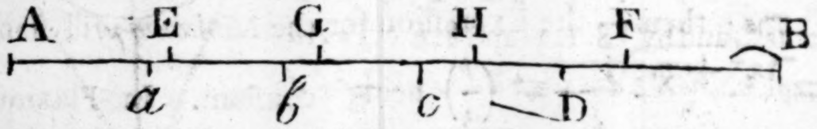
The Propoſer Mr. *Tho. Moſs*, anſwers the third Queſtion, by the following *Demonſtration*.

Firſt, then, let a right Line AB, be divided in F in the Ratio of 1 to 3. Now, we are in this Circumſtance, to prove that $AF^3 \times FB$ is a *Maximum*, in order to do which, let AF be divided into three equal Parts as AE, EP, and PF:

Moreover divide AD (any Diſtance leſs than AF) into three equal Parts, as AG, GI, and ID; then, it is plain $AG^3 : AE^3 :: AD^3 : AF^3$. That is, the Cube of $\frac{1}{3}$ of any right Line (or Number) is always in a conſtant Ratio to the Cube of the whole Line (or Number) ∴ $AG \times GI \times ID$, is in the very ſame Ratio to AD^3, as $AE \times EP \times PF$ is to AF^3; but the latter $AE \times$



$EP \times PF$, (or AF^3 which is a Multiple of it) multiplied by FB, muſt be greater than $AG \times GI \times ID$ (or than AD^3 which is the ſame Multiple of $AG \times GI \times ID$ as AF^3 is of $AE \times EP \times PF$) multiplied by DB; becauſe, it is evident, from *Eu.* 2. 5. that, if a right Line be divided into any given Number of Parts, the continual Product of thoſe Parts of the Line, will be the greateſt poſſible, when the ſaid Parts are = to each other. By the very ſame Method of Reaſoning, it may be proved, if BF, be taken for AF, in the Ratio of 1 to 4, that $AF^4 \times FB$, is a Maximum: For let another Point D, be taken, and divide AD into 4 = Parts; A*a*, A*b*, *bc*, and *c*D; alſo



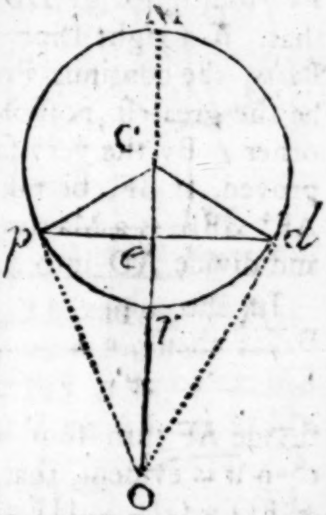
divide AF into four equal Parts; AE, EG, GH, and HF; then it is evident, that $AE^4 : AF^4 :: Aa^4 : AD^4$.; that is, $AE \times EG \times GH \times HF$ (or AE^4) is in the ſame Ratio to AF^4, as $Aa \times ab \times bc \times cD$ (Aa^4) is to AD^4, whereſoever the Point D be taken; provided the Diſtance AD be divided (as well as the Diſtance AF) into four equal Parts: but by the abovementioned Propoſition, $AE \times EG \times GH \times HF \times FB$, for $AF^4 \times FB$ which is a Multiple of it) will be a Maximum: From whence it appears, that if a right Line be divided into any given Number of equal Parts, the Product made by one of thoſe Parts, and the Remainder of the Line raiſed to the Power, whoſe Exponent is equal to the ſaid given Number of equal Parts, *Minus* one, will be a *Maximum*; whence the Truth of the Propoſition is manifeſt. Q. E. I.

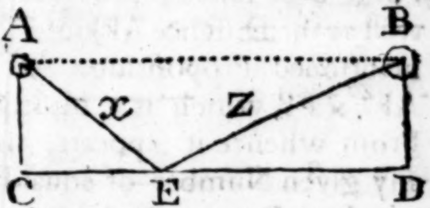
3 Queſtion (143) anſwer'd by Mr *Tho. Garrard*.

Let *a*, repreſent the greater Part; and *b*, the leſſer Part; and, let A and B, be put for their Logarithms reſpectively. And (putting *n* for the Exponent of the greater Part) we have by the Queſtion $nA+B$ a *Maximum.*——Now let a be augmented, or diminiſhed by the indefinitely ſmall Quantity e, then will $a\pm e$, denote the greater Part, and $b\mp e$ the leſſer; and let their Logarithms be repreſented by $A\pm c$, and $B\mp d$ reſpectively: Then by the Nature of Logarithms $a:b::d:c$. But it is evident, that when $nA+B$ is a Maximum, B muſt increaſe or decreaſe, juſt n times as faſt as A decreaſes or increaſes; or, $nc=d$, which being written for d, in the above Analogy, it becomes $a:b::nc:c$, $\therefore bn=a$, or $a:b::n:1$.

4 Queſtion (144) anſwer'd by Mr. *Tho. Garrard.*

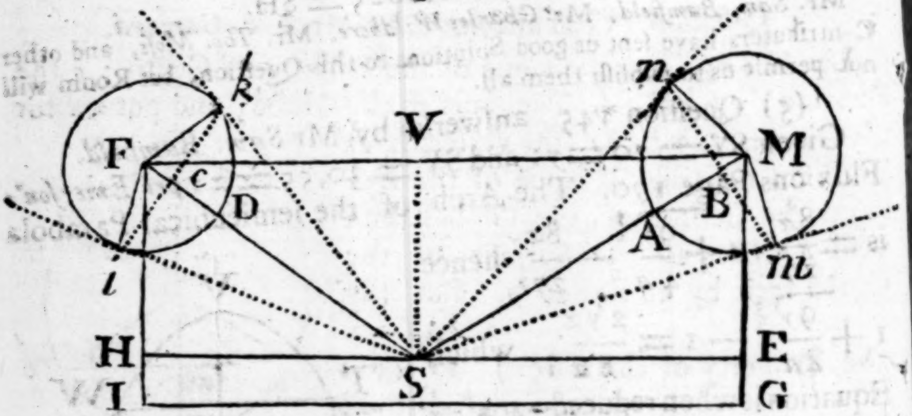
Let $Mdrp$, repreſent one of the Balls, c its Centre; o the Poſition; op and od, Tangents to the Globe; and put $2d$ for it's Diameter, $v=er$ (the verſed Sine) and $z=co$ (the Diſtance of the Eye from the Centre of the Globe) then will do, be as the Surface of the Globe ſeen by an Eye at o. But (by the Property of the Circle) $\overset{v\times\overline{2d-v}}{er\times em}=\overline{de}^2$; and by 18. E.3. and 8. E.6. $\overset{\overline{d-v}\times\overline{z+v-d}}{ce\times eo}=\overline{de}^2$ $\therefore v\times\overline{2d-v}=\overline{d-v}\times\overline{z+v-d}$ $\therefore dv=dd-\frac{d}{z}$ which will always be as the Superficies of the Globe ſeen at o, let oc, and cd, be what they will; Which being premiſed, put $n=7$ Feet, the Diameter of the leſſer Ball A; $c=9$ Feet, the Diameter of the greater Ball B, and $d=300$ Feet, $=AB=CD$ their Diſtance from each other; and $a=AC=BD=20$ Feet; E the Poſition of the Eye; $AE=x$, $BE=z$ and $DE=y$; then by the Queſtion and what has been premiſed, we have $cc-\frac{c^3}{z}+nn-\frac{n^3}{x}$, or, rather $\frac{c^3}{z}-\frac{n^3}{x}$ a Maximum $\therefore c^3\dot{z}xx=n^3\dot{x}zz$; and by writing $\overline{aa+dd-2dy+yy}$ for xx, $aa+yy$ for zz $\frac{y\dot{y}-d\dot{y}}{\sqrt{aa+dd-2dy+yy}}$ for $\dot{x}$, and $\frac{y\dot{y}}{\sqrt{aa+yy}}$ for $\dot{z}$; and





and dividing the whole by $\dot{y}$ we have $c^3\dot{y}\times\overline{aa+dd-2dy+yy}|^{\frac{3}{2}}$ $=\overline{n^3y-n^3d}\times\overline{aa+yy}|^{\frac{3}{2}}$, where the Value of y will be found $=178{,}7282=$ ED; hence EC $=121{,}2768$. *N. B.* From the general Expreſſions $c^3xx\dot{z}=n^3zz\dot{x}$, it appears that when the Motion of the Eye is in a ſtraight Line between the two Balls, then $\dot{x}=\dot{z}$ and conſequently $c^3xx=n^3zz$; or $c^3:n^3::zz:xx$.

Mr. *Will. Bevil*, the Propoſer's Solution to the fourth Queſtion.



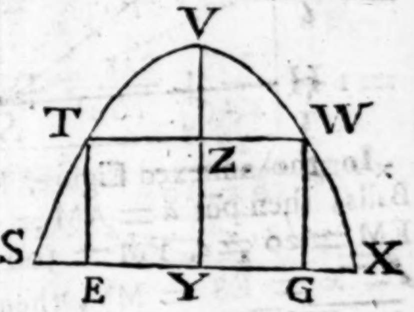
In the annexed Figure, let F and M repreſent the two Balls; then put $a=\text{AM}=\frac{9}{2}$, $b=\text{DF}=\frac{7}{2}$, GM — EG $=$ EM $=20=c$, FM $=300=d$, and $x=\text{HS}=\text{FV}$, then $d-x=\text{ES}=\text{MV}$, then $\sqrt{c^2+x^2}|=\text{FS}=z$, and $\overline{c^2+\overline{d-x}|^2}|^{\frac{1}{2}}=\text{MS}=y$. Then *per Sim.* △'s, $y:a::a:\frac{a^2}{y}=\text{BM}$, $\frac{ay-a^2}{y}=\text{AB}$; again $z:b::b:\frac{b^2}{z}=\text{FC}$, $\frac{bz-b^2}{z}=\text{CD}$, and $\frac{ay-a^2}{y^2}\times 2a\times 3{,}1416=$ Surface A*nm* ſeen at S $\frac{bz-b^2}{z}\times 2b\times 3{,}1416=$ Surface D*ik* ſeen at S. Then $\frac{2b^2z-2b^3}{z}\times 3{,}1416+\frac{2a^2y-2a^3}{y}\times 3{,}1416=$ Sum of the Surfaces which muſt be a Maximum in Fluxions $\frac{b^2zz-b^2z\dot{z}+b^3\dot{z}}{z^2}+\frac{a^2y\dot{y}-a^2y\dot{y}+a^3\dot{y}}{y^2}=0$; or rather $\frac{b^3\dot{z}}{z^2}+\frac{a^3\dot{y}}{y^2}=0$. But $z=\sqrt{c^2+x^2}|$ and $y=\overline{c^2+\overline{d-9}|^2}|^{\frac{1}{2}}$, then $\dot{z}=\frac{x\dot{x}}{\sqrt{c^2+x^2}}\frac{1}{2}$ and $\dot{y}=\frac{-d\dot{x}+x\dot{x}}{\sqrt{c^2+\overline{d-x}|^2}}$ Therefore we have the following Equation, and only one unknown

known Quantity $\frac{b^3 x \dot{x}}{\sqrt{c^2+x^2} \times \overline{c^2+x^2}} + \frac{-d\dot{x}+x\dot{x} \times a^3}{\sqrt{c^2+\overline{d-x}^2} \times \overline{c^2+\overline{d-x}^2}}$ $= 0$; or $\frac{b^3 x}{\sqrt{\overline{c^2+x^2}}|^{\frac{3}{2}}} = \frac{\overline{d-x} \times a^3}{\sqrt{\overline{c^2+\overline{d-x}^2}}|^{\frac{3}{2}}}$. But if ſquared $\frac{b^6 x^2}{\sqrt[3]{\overline{c^2+x^2}|}}$ $= \frac{\overline{d-x}^2 \times a^6}{\sqrt[3]{\overline{c^2+\overline{d-x}}|^{2}}}$ which is an Equation of the eighth Power; whence the Value of $x = 121{,}2625 =$ SH.

Mr. *Sam. Bamfield*, Mr. *Charles Wildbore*, Mr. *Tho. Moſs*, and other Contributers have ſent us good Solutions to this Queſtion, but Room will not permit us to publiſh them all.

(5) Queſtion 145. anſwer'd by Mr *Sam. Bamfield.*

Given SY $= 20 = y$; and SV $= 30{,}55 = z$; *per Emerſon's* Fluxions Page 170. The Arch of the ſemicubical Parabola is $= \frac{8a}{27} \times \overline{1+\frac{9y}{4a}}|^{\frac{3}{2}} - \frac{8a}{27}$; hence $\overline{1+\frac{9y}{4a}}|^{\frac{3}{2}} - 1 = \frac{2yz}{8a}$; which Equation is when reduced $729y^3 = 729zza - 972yya + 432zaa - 432yaa$; which Quadratic gives, $a = 15{,}9792$. From whence VY is found $= 22{,}3906$.



For the greateſt Parallelogram, put $b^3 =$ VY°; $c =$ SY; $x^3 =$ ZV^n; and let $d =$ VY; then $d - x^{\frac{3}{2}} =$ ZY *per* Curve $b^3 : c^3 :: x^3 : \frac{c^3 x^3}{b^3} =$ TZ^3 $\therefore \frac{cx}{b} =$ TZ, which x^d by ZY $= \frac{cdx - cx^{\frac{5}{2}}}{b} =$ Maximum. In Fluxions, $cd\dot{x} - \frac{5}{2}c\dot{x}x^{\frac{3}{2}} = 0$. Reduced $\frac{2d}{5} = x^{\frac{3}{2}} = 8{,}95624 =$ VZ: Hence ZY $= 13{,}43436$; and TZ $= 10{,}8577$, and the Area of the Parallelogram required $= 291{,}732$.

The ſame anſwer'd by Mr. *John Boſton* of *Biggleſwade.*

The given Equation $px^2 = y^3$, and $y = 20$ the Semi-ordinate. Then $\sqrt{\dot{x}^2+\dot{y}^2} = \dot{y} \times \overline{\frac{9y}{4p}+1}|^{\frac{1}{2}}$, whoſe Fluent corrected is $\frac{8p}{27} \times \overline{\frac{9y}{4p}+1}|^{\frac{3}{2}} - \frac{8p}{27} = \frac{61{,}1}{2} = 30{,}55$, which Equation reſolved, gives $p = 16$; whence $x = \sqrt{\frac{y^3}{p}} = 22{,}36$.

Let $a =$ ZV, $z =$ TZ; then YZ $= x - a$: and *per* Equation of the Curve $pa^2 = z^3$, $p^{\frac{1}{3}} a^{\frac{2}{3}} = z$; then $2p^{\frac{1}{3}} a^{\frac{2}{3}} = 2z =$ TW; and $2p^{\frac{1}{3}} a^{\frac{2}{3}} \times \overline{x-a} = 2xp^{\frac{1}{3}} a^{\frac{2}{3}} - 2p^{\frac{1}{3}} a^{\frac{5}{3}} =$

to the Area of the Parallelogram E T W G = a Maximum; in Fluxions $^{4} x p^{\frac{1}{3}} a^{-\frac{1}{3}} \dot{a} - \frac{10}{3} p^{\frac{1}{3}} a^{2} \dot{a} = 0$. Whence $a = \frac{2}{5} x = 8,944$; and the Area required is 291,327.

Mr. *Will. Kingſtone*, of *Bath*, anſwers the 5th Qu. thus.

Let $y = SY = YX = 20$; $z = 30,55$; $x = YV$; $v = YZ = TE = WG$. Then, by the Property of the Curve $ax^2 = y^3 \therefore x = \frac{y^{\frac{2}{3}}}{a^{\frac{1}{2}}}$. Flux'd is $\dot{x} = \frac{3}{2}\frac{y^{\frac{1}{2}}\dot{y}}{a^{\frac{1}{2}}} \therefore \dot{x} = \frac{9}{4a} y \dot{y}^2$; which put for $\dot{x}^2$ in $\sqrt{\dot{x}^2 + \dot{y}^2}$ gives $\dot{y}\sqrt{\frac{1+9y}{4a}} = z$, whoſe Fluent is $z = \frac{8a}{27} \times \overline{1 + \frac{9y}{4a}}^{\frac{3}{2}}$, which corrected by making $y = 0$, gives $z = \frac{8a}{27} \times \overline{\frac{1+9y}{4a}}^{\frac{3}{2}} + \frac{8a}{27}$ therefore $\frac{27z+8a}{8a} = 1 + \frac{27z}{8a} = \overline{\frac{1+9y}{4a}}^{\frac{3}{2}} \therefore 1 + \frac{54z}{8a} + \frac{729z^2}{64a^2} = 1 + \frac{27y}{4a} + \frac{243y^2}{16a^2} + \frac{729y^3}{64a^3} \therefore a^2 + \frac{27z^2 - 36y^2}{16z - 16y} \times a = \frac{27y^3}{16z-16y}$ □ C, gives

$$a = \frac{3\sqrt{81z^4 - 216z^2y^2 - 48y^4 + 192zy^3} - 27y^2 + 36y^2}{32z - 32y}$$

$= 16$. Whence $x = \frac{y^{\frac{3}{2}}}{\sqrt{a}} = 22,36$, by the Property of the Curve $a \times \overline{x - v}^2 = TZ^3$; whence alſo $2v + a^{\frac{1}{3}} \times \overline{x - v}^{\frac{2}{3}}$ = the Area, a Maximum, and in Fluxions is $\frac{6ax^2\dot{v} - 16axv\dot{v}\ 10av^2\dot{v}}{3 \times a^{\frac{2}{3}} \times \overline{x - v}^{\frac{1}{3}}} = 0. \therefore 3x^2 - 8xv + 50^2 = 0. \therefore v^2 - \frac{8xv}{5} = -\frac{3x^2}{5}$; the □ C, gives $v = \frac{3x}{5} = 13,419$, andthe Area = 291,1272.

The ſame anſwer'd by Mr. *Tho. Allen* of *Spalding*, *Lincolnſhire*.

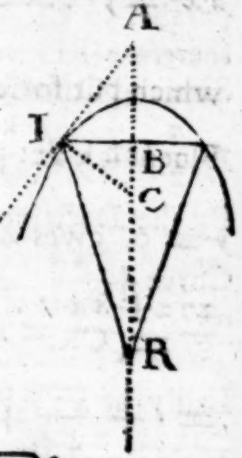
Let STVWX be a cubical Parabola, whoſe Ordinate SX, let $2y$ repreſent; then, by the Doctrine of Fluxions, we ſhall have $\frac{8p}{27} \times \overline{1 + \frac{180}{4p}}^{\frac{3}{2}} - \frac{8p}{27} = 30,55$, whence the Parameter $p = 16$; and by the Equation of the Curve, the Abſciſſa YV (a) is found = 22,36.

Now call YZ, x; VZ, $a - x$; then by the Nature of the Curve, $\overline{p \times \overline{a - x}^2}^{\frac{1}{3}} = ZW = ZT \therefore a^2x^3 - 2ax^4 + x^5$ is a Maximum. In Fluxions $3a^2x^2\dot{x} - 8ax^3\dot{x} + 5x^4\dot{x}$

$= 0$. Reduced $x = 13{,}418 = ZY$. Conſequently $ZV = 8{,}942$; $ED = 10{,}856$. And the Area of the greateſt Parallelogram $= 291\ 3316$.

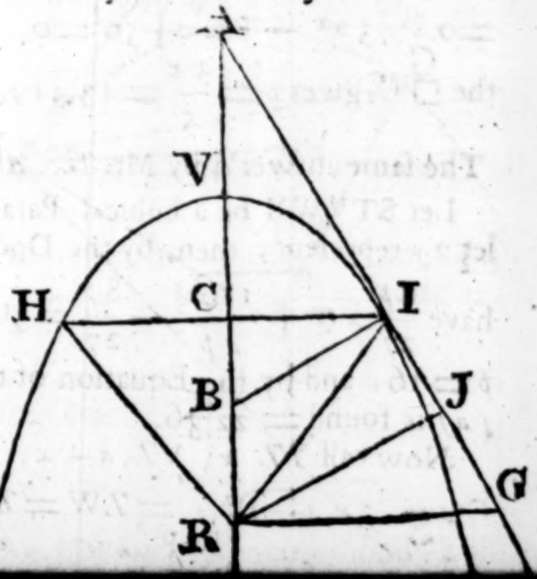
Mr. *Zach. Gaſkill*, Mr. *Charles Wildbore* of *Nottingham*, Mr. *Lionel Charlton*, Mr. *John Thompſon*, Mr. *Abraham Botham*, *Careleſs Jack*, and other ingenious Contributors, ſent us Solutions to this Queſtion; but as the above inſerted are ſufficient, omit the reſt.

6 Queſtion (146) anſwered by the Propoſer, *Tabularius*.



Let $8 = a$, $BI = y$, $AB = 2x = \frac{2y^2}{a}$, by the Equation of the Curve, and Radius $= 1$; Then $\frac{2y^2}{a} : 1 :: y : \frac{a}{2y} =$ Tangent of the Angle $BAI = BIC \because \frac{4ay}{4y^2 - a^2} =$ Tangent of the $< BIR$; and $4 : y :: \frac{4ay}{4y^2 - a^2} : \frac{4ay^2}{4y^2 - a^2} = BR$. Whence, by the Nature of the Queſtion, we have $\frac{16a^2y^4}{\overline{4y^2 - a^2}|^2} + y^2 = \frac{\overline{a^2 + 4y^2}\big)^3}{4a^4}$; $\therefore \frac{16a^4x^2}{\overline{4ax - a^2}\big)^3} + ax = \frac{\overline{4ax + a}\big)^3}{4a^4}$; by Reduction $\frac{ax}{16x^2 - 8ax + a^2} = \frac{4x + d}{4a}$; and by a further Reduction, $x^3 - \frac{ax^2}{4} - \frac{a^2x}{8} + \frac{a^3}{64} = 0$. In Numbers, $x^3 - 2x^2 - 8x + 8 = 0$. From which $x = 3.60388$, and thence $y = 5{,}36945$; and the $< BIC = RIC = 36°\ 41'$; which determines the Points I and R, required.

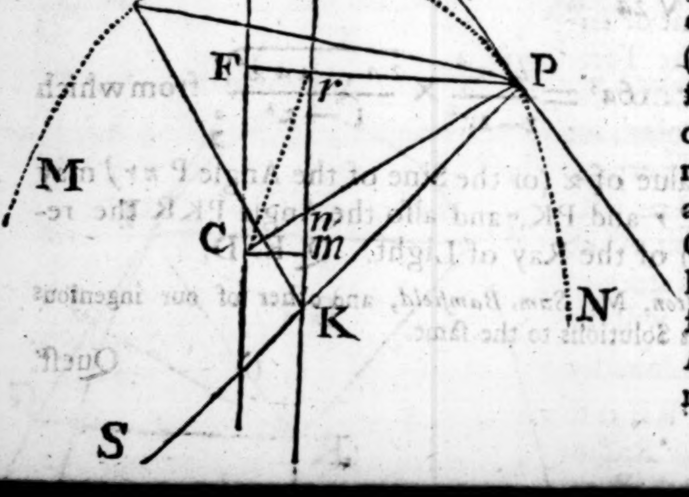
The ſame anſwer'd by Mr *Zach. Gaſkill*.



In the Figure let R be the Point of Interſection, I the Point of Incidence, AG the Tangent or Direction of the Curve at that Point; let RG, and IB be perpendicular to the Axis VR, and the Tangent AG; Then by the Nature of the Figure CB will be equal to $\frac{a}{2} = 4$, and by the Queſtion; RI, is to be equal to the Radius of Curvature at the Point

I; now, it is manifeſt that the Ray after the firſt Reflexion, muſt croſs the Axis at right Angles, in order to its making the Angle with the Direction of the Curve on the alternate Side of the Glaſs (as at H) equal and in all Reſpects ſimilar; for otherwiſe it cannot after the ſecond Reflexion interſect the incident Ray in that Line: Now, as the Angle of Reflexion CIA = to the incident Angle RGI = < IGR; RG being parallel to CI, and the perpendicular RI common to both, therefore RG will be likewiſe = RI; put x and y, for the Sine and Coſine of the Angle AGR = < IBC = < AIC. Then $y : \frac{a}{2}$ (= CB) $:: x : \frac{ax}{2y}$ = CI, and in like Manner $\frac{a}{2y}$ = IB, By the Doctrine of Fluxions $4 \times \frac{\mathrm{IB})^3}{aa}$ = IR the Radius of the Curve $+ \frac{4a}{8y^3}$. As Radius : $\frac{4a}{8y^3} :: 2xy$ (= Sine of the < CIR) : $\frac{ax}{y^2}$ = CR. And, as $y : \frac{ax}{2y}$ (CI) $:: x : \frac{axx}{2yy}$ = AC. Laſtly, as x : AR $\left(= \frac{axx}{2yy} + \frac{ax}{y^2}\right) :: y : \frac{4a}{8y^3}$ = RG = RI. Multiply the Extreams, and Means, and by proper Reduction we ſhall have $x^3 + 2x^2 - x = 1$. Solved, $x = ,8019377$, anſwering to 53° 18′ 56″. Whence the Point of Interſection from the Vertex = 21,5797. And the Radius of the Curve 18,7606 making (the Direction of the Ray) an Angle with the Axis of 16° 37′ 52″.

Our worthy Contributor Mr. *Tho. Moſs*, anſwers it thus.

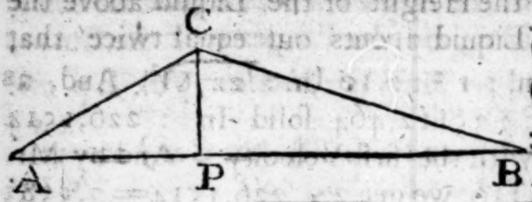


Let SKP, be the required Direction of the Ray of Light falling upon the parabolic Concave Speculum (MVN) at P; from whence conceive it to be reflected to G, and again from G to K, the Point of Interſection of the Axis of the Parabola and the ſaid Ray of Light. Put the Parameter ($= 8 = 2rn$) $= 2a$; $Vr = x$, and the Sine of the Angle $Pnr = z$ (Radius being $= 1$). Then, firſt we have, by the Property of the Curve, $Pr\ (= y) = \sqrt{2ax}$; and *per Simpſon's Fluxions*, Vol. I. p. 76. $PC\ (= PK) = \frac{\overline{2a + 4x}|^{\frac{3}{2}}}{2\sqrt{2a}}$; and alſo $FR\ (= Cm) = \frac{4x^{\frac{3}{2}}}{\sqrt{2a}}$. Moreover the Sine of the Angle PKr will be truly expreſſed (becauſe of the equal Radii PC and PK) by $z \times \frac{\frac{4x^{\frac{3}{2}}}{\sqrt{2a}} + \sqrt{2ax}}{\sqrt{2ax}}$ $\left(= \frac{4z\sqrt{x^3} + 2az\sqrt{x}}{2a\sqrt{x}}\right) = \frac{2z + az}{a}$; whence by Trigonometry $\frac{2zx + az}{a} : \sqrt{2ax} :: 1 : \frac{\overline{2a + 4x}|^{\frac{3}{2}}}{2\sqrt{2a}}$; $\therefore \sqrt{2ax}$ $= \frac{2zx + az}{a} \times \frac{\overline{2a + 4x}|^{\frac{3}{2}}}{2\sqrt{2a}}$; But, by Trigonometry as z : $\sqrt{2ax} :: \sqrt{1 - z^2}$ (the Coſine of Pnr) : a $\therefore \sqrt{2ax - 2axz^2}$ $= az$; or $a^2z^2 = 2ax - 2axz^2$; $\therefore x = \frac{a^2z^2}{2a - 2az^2} = \frac{az^2}{2 - 2z^2}$; which being ſubſtituted for x, in the firſt Equation, we get $\sqrt{\frac{2a^2z^2}{2 - 2z^2}}$ $\left(\text{or } \frac{az\sqrt{2}}{\sqrt{2 - 2z^2}}\right) = \frac{2az^3 + a^2z^3}{2a - 2az^2} \times \frac{\overline{2a - \frac{4az}{2 - 2z^2}}|^{\frac{3}{2}}}{2\sqrt{2a}}$; or (by putting $2 + a = b$) $\frac{az\sqrt{2}}{\sqrt{2 - 2z^2}} =$ $\frac{bz^3}{2 - 2z^2} \times \frac{\overline{\frac{4a - 8az^2}{2 - 2z^2}}|}{2\sqrt{2a}}$; or $\frac{2az^2z^2}{2 - 2z^2} = \frac{b^2z^6}{\overline{2 - 2z^2}|^2} \times \frac{\overline{\frac{4a - 8az^2}{2 - 2z^2}}|^3}{8a}$; $\therefore 16a^3 = \frac{b^2z^4}{2 - 2z^2} \times \frac{\overline{2a - 4az^2}|^3}{1 - z^2}$; from which Equation the Value of z (or the Sine of the Angle Pnr) may be found, and Pr and PK, and alſo the Angle PKR the required Direction of the Ray of Light. Q. E. D.

Mr. *Lionel Charlton*, Mr. *Sam. Bamfield*, and other of our ingenious Contributors ſent us Solutions to the ſame.

Queſt.

7 Queſt. (147) anſwer'd by Mr *Abr. Botham* of *Watnall.*



Let AC $= a = 80$; CB $= b = 120$; and CP$=p$. Then $\sqrt{aa-pp} =$ AP; and $\sqrt{bb-pp} =$ BP. And *per* Queſtion $\sqrt{aa-pp} : \sqrt{bb-pp} :: \sqrt{bb-pp} : \sqrt{aa-pp} + \sqrt{bb-pp} \therefore bb-pp = aa-pp + \sqrt{aa-pp} \times \sqrt{bb-pp}.$ This Equation properly reduced becomes $b^4 - 3bbaa + a^4 = p^4 - aa + bb \times p^2$. The Square compleated, and afterwards extracted $1{,}118\,bb - 1{,}118\,aa = \frac{aa+bb}{2} - pp$. Therefore $p = \sqrt{1{,}618\,aa - 0{,}618\,bb} = 38{,}157$. AP $= 70{,}31$. PB$= 113{,}7$ &c. And the Area of the Baſe of the Priſm $= 3512{,}161$; which is 1987,48 times greater than the Area of a Hole whoſe Diameter is $1\frac{1}{2}$ Inch. Now, as the Velocity by which the gravitating Liquor flows from the Veſſel, is equal to that which a heavy Body would acquire in falling the ſame Diſtance as the Height of the Liquor in the Veſſel; therefore a Column thereof would be ,2276 of a Second in emptying itſelf when the Liquor is 10 Inches high; Now $1987{,}48 \times 0{,}2276 = 452{,}345$ Seconds, or 7′ 32″, 34″ the Time the Liquor takes in emptying itſelf.

Mr. *Charles Wildbore* of *Nottingham*, anſwers it thus.

Let $s =$ the Sum, and $d =$ the Difference of the Sides; $x =$ AB, then (*per* 30 Euclid. 6.) $,61803x$ PB, and, $38197x =$ AP, their Difference is $23606x$. And *per* Trigonometry $x : s :: d : 23606x$. Multiplying Extremes and Means, we get this Equation, $23606x^2 = sd$. Ergo $\sqrt{\frac{sd}{,23606}} = 184{,}09$; whence the Solidity of the Priſm $= 35125$ cubic Inches. And it is proved by Writers on Hydroſtaticks, that a Cylinder of Water, whoſe Height is 193 Inches, would empty itſelf in a ſecond of Time, and the Area of the Hole $= 1{,}76715 \times 193 = 341{,}05995$ cubick Inches, the Velocity *per* Second; and $35125 \div 77{,}637 = 452''{,}\,45 = 7'\,32''\,27'''$ the Time of its emptying itſelf.

Mr. *Will. Lucas* of *Cottingham*, ſolves the 7th Queſtion thus.

By Trigonometry AB $= 184{,}08$, and CP$= 38{,}159$; whence the ſolid Content of the Priſm $= 35112{,}464$ ſolid

Inches; and by the Laws of Hydroſtaticks, in the Time that a Body is falling through the Height of the Liquid above the Hole, a Column of the Liquid ſpouts out equal twice that Height; hence as 193 In. : 1″² : : 10 In. : $\overline{''2276}|^2$. And, as 35,343 ſolid In. ″2276 : : 35112,464 ſolid In. : ″226,1514 = Time of running out with the firſt Velocity. And by Mr. *Emerſon's* Fluxions, Page 110, we get 2 × ″226,1514 = 7,5383 Minutes, the whole Time of running out.

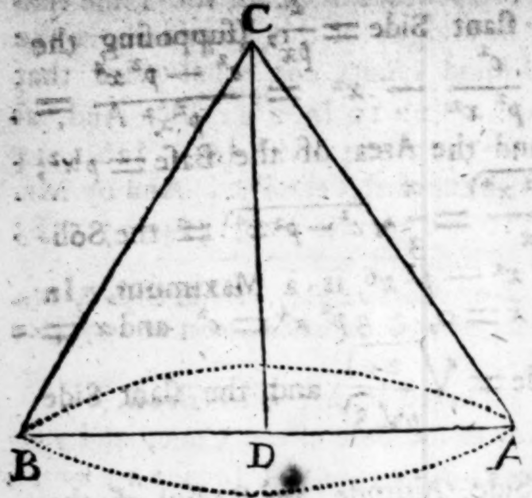
Mr. *Lionel Charlton*, Mr. *Sam. Bamfield*, Mr. *Zach. Gaſkell*, Mr. *Tho. Moſs*, and ſeveral other ingenious Contributors, ſent us very good Solutions to this Queſtion.

8 Queſtion (148,) anſwered by Mr. *Will. Bevil.*

Let $x = \frac{1}{2}$ the Diameter of the Baſe of the Cone, and $y =$ the Length of the ſlaint Side; $p = 3,1416$: then $pxy = c$; and $px \times \frac{1}{3} \sqrt{y^2 - x^2} = s$; by expunging y, it will be $\frac{p}{3} \times x^2 \sqrt{\frac{c^2}{p^2x^2} - x^2} = s$; which ſquared, and put in Fluxions is $2c^2 - x\dot{x} - 6p^2 x5 \dot{x} = 0$. Or, $c^2 = 3p^2 x4 = p^2 x^2 y^2$; or $3x^2 = y^2$. Hence $x^2 : : y^2 : : 1 : 3$, that the Square of half the Diameter of the Cone, is to its ſlaint Side : : as 1 : is to 3. Again, by reſuming the two Equations, that is $pxy = c$, and $\frac{px^2}{3} \sqrt{y^2 - x^2} = s$; and by expunging y; $\frac{9s^2 + p^2 x6}{x^2} = c^2$; this in Fluxions is, $6p^2 x7 \dot{x} - 18 s^2 x\dot{x} - 2p^2 x7 \dot{x} = 0$. Or $4pxx^6 - 18s^2 = 0$; and $s^2 = \frac{2p^2 - x^6}{9} = \frac{p^2}{9} \times \overline{y^2 x4 - x^6}|$; whence $3x^2 = y^2$. Hence $x^2 : y^2 : : 1 . 3$ the very ſame as before.

The ſame anſwered by Mr. *Tho. Moſs*.

Let the Diameter AB $= x$, and AC (= BC) $= y$; alſo put $p = ,7854$, the Area of a Circle whoſe Diameter is Unity; then the Periphery of the Baſe will be $4px$; the Area thereof px^2, and convex Superficies of the Cone will be expreſſed by $2pxy = c \therefore y = \frac{c}{2px}$: Moreover $\sqrt{y^2 - x^2} =$ CD, or $\sqrt{\frac{c^2}{4p^2x^2} - x^2} =$ CD, which being drawn into $\frac{px^2}{3}$ ($\frac{1}{3}$ of the Area of the Baſe) becomes $\frac{px^2}{3} \sqrt{\frac{c^2}{4p^2x^2} - x^2}$ a Maximum; or $\frac{c^2x^2}{36} - \frac{p^2x^6}{36}$ a Maximum; in Fluxions, $\frac{2c^2x\dot{x}}{36}$



$\frac{2c^2x\dot{x}}{36} - \frac{6p^2x^5\dot{x}}{36} = 0$; hence $x^4 = \frac{c^2}{3p^2}$, and ∴ $x^2 = \frac{c}{p \times \sqrt{3}}$; then $y^2 = \frac{c^2}{4p^2x^2} = \frac{c^2}{4p^2 \times \frac{c}{p\sqrt{3}}}$ $\left(= \frac{\frac{c^2}{4p^2c}}{p \times \sqrt{3}} = \frac{c^2\sqrt{3}}{4pc} \right)$ $= \frac{c\sqrt{3}}{4p}$; whence x^2 (AB^2) : y^2 (BC^2) : : $\frac{c}{p\sqrt{3}}$: $\frac{c\sqrt{3}}{4p}$: : $\frac{1}{\sqrt{3}}$: : $\frac{\sqrt{3}}{4}$ (: : 1 : $\frac{3}{4}$) : : 4 : 3. Whence it appears that the greateſt Solidity of a Cone, under a given convex Superficies will be, when the Square of the whole Baſe is to that of the ſlaint Side, in the Ratio of 4 to 3; or when the Square of the Perpendicular: is to the Square of the Diameter of the Baſe in the Ratio of 1 to 2; or, which is the ſame Thing, when the ſaid Perpendicular; : is to the whole Diameter (AB) as $\sqrt{2}$: 2. Q. E. D.

Mr. *Benj. Donn* of *Bideford*, ſent us the following Solution to the 8th Queſtion; done by Maſter *Thomas Bowen* of *Briſtol*, late of Mr. *Donn's* School, (ſee Mr. *Moſt's* Scheme)

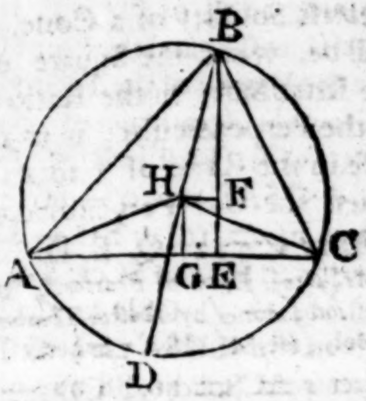
Let s = Solidity, CD $= x$, $c = 3,1416$; then $\overline{BA)}^2 = \frac{3s}{cx}$; and BA $= \frac{\overline{3s^2)}^{\frac{1}{2}}}{cx}$. Hence $\overline{DA}^2 = \frac{3s}{4cx}$; and by 47 Eu. 1 CA $= \overline{x^2 + \frac{3s}{4cx})}^{\frac{1}{2}}$; hence alſo, by Menſuration $\frac{c}{2} \times \overline{\frac{3s}{cx}}^{\frac{1}{2}} \times \overline{x^2 + \frac{3s}{4cx})}^{\frac{1}{2}}$ = the convex Superficies; ∴ $\frac{3s}{cx} \times \overline{x^2 + \frac{3s}{4cx}}$ is to be a Maximum. Which in Fluxions is $\frac{3s\dot{x}}{c} - \frac{9s^2\dot{x}}{2cx^3} = 0$. Reduced $x = \overline{\frac{3s}{2c})}^{\frac{1}{2}}$.

Tabularias the Propoſer's own Solution to the ſame.

Put $3,1416 = p$, Radius of the Baſe $= x$; its Circumference $= 2px$; and the ſlant Side $= \frac{c}{px}$, (ſuppoſing the convex Surface given) $\therefore \frac{c^2}{p^2 x^2} - x^2 = \frac{c^2 - p^2 x^4}{p^2 x^2} =$ Square of the Altitude, and the Area of the Baſe $= px^2$, whence $px^2 = \sqrt{\frac{c^2 - p^2 x^4}{3px}} = \frac{x}{3}\sqrt{c^2 - p^2 x^4} =$ the Solidity, a Maximum; or $c^2 x^2 - p^2 x^6$ is a Maximum, In Fluxions $2c^2 x \dot{x} - 6p^2 x5 \dot{x} = 0$, $\therefore 3p^2 x^4 = c^2$; and $x = \sqrt{\frac{c}{p\sqrt{3}}}$: Hence the Altitude $= \sqrt{\frac{2c}{p\sqrt{3}}}$ and the ſlant Side $= \sqrt{\frac{c\sqrt{3}}{p}}$; $\therefore$ the ſlant Side, Altitude, and Radius of the Baſe are, as 1 $\sqrt{\frac{2}{3}}$, and $\sqrt{\frac{1}{2}}$; or as $\sqrt{3}$, $\sqrt{2}$, and 1.)

(9) Queſt. 149. anſwered by Mr. *Steph. Metcalfe* of *Walpoole.*

Conſtruction.



Let ABC be the propoſed Triangle, DB the Diameter of its circumſcribing Circle; then, by Theorem the 17th of *Ward's* Introduction $\frac{AB \times BC}{BE} = DB = 18$. From the Center at H, draw the Radii HA, HC; draw the Perpendicular HG, which will be parallel to BE; then draw HF parallel to AC, and the thing is done.

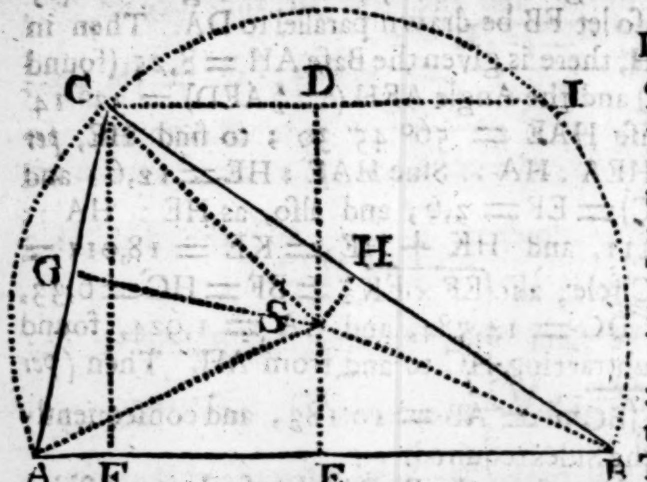
Calculation.

In the Triangle AHC are given, the two Sides AH, HC (each equal to 9) and the included Angle AHC = 132° 58′ (being double by 20 *Eu.* 3. to the Angle at the Periphery, *viz.* the given vertical Angle ABC = 66° 29′) from whence by common *Trigonometry* are found, the Baſe AC = 16,504992, and Perpendicular HG = (FE) = 3,5912.

Again, in the right angled Triangle HBF, are given the Perpendicular BF = BE — HG, and Hypothenuſe HB = AH = HC; from which is found the Angle HBF = 44° 35′ 39″ 40‴. This taken from 66° 29′ the given vertical Angle, and the Remainder divided by 2, gives the Angle EBC = 10° 56′ 40″ 10‴ = Angle ABD; whoſe Complement to 90°, is the Angle ACB = 79° 3′ 19″ 50‴.

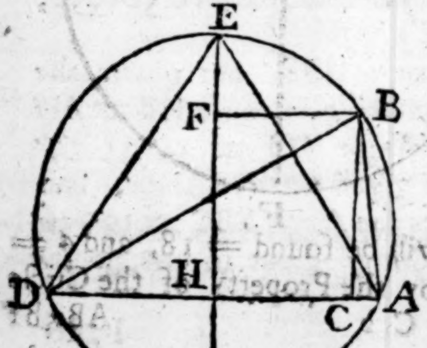
Laſtly, in the Triangle ABC are given the Baſe AC, and all the Angles, from whence the Sides are found to be 10,1852496, 16,504992, and 17,672607 reſpectively.

Mr. *B. Donn*, ſent the following Solution to the ſame.



Let $2a$ = the Rectangle = 180, c = Perpendicular = 10, s = Sine of 66° 29′; then $2as$ = twice the Area of the Triangle, and ∴ $\frac{2as}{c}$ = the Baſe = 16,505. Now to conſtruct the Triangle; On AB = 16,505 make a Segment of a Circle ACB, capable of containing an < of 66° 29′, and parallel to AB at 10 diſtant, draw the Line CI, and the Point C, where it interſects the Circle, will be the Vertex of the Triangle; hence, drawing AC, and BC, the Triangle is conſtructed. Now, to determine the Sides *trigonometrically*. Firſt in Rt < △ ASE, we have given AE = ½ AB; and < SAE = 90°—66° 29′ = 23° 31′; to find SE, and AS; then FC = (10) or ED — SE = SD; whence in Rt. ∠ △ SDE, are given SD and SC = SA, to find the ∠ CSD. Now 180 — ∠ ASE — ∠ CSD = < CSA; and then in R^t < △ ASG, are given the < GSA = ½ < CSA, and AS, to find AG = ½ AC; hence AC = 10,88 one of the Sides; again, 360° — < CSA — < BSA, or twice the < ASE = < CSB; and ½ < CSB = BSH ∴ in R^t < △ BSH are given the < BSH, and BS = SA, to find BH = ½ BC; whence BC = 17,672 the other Side, which was to be found.

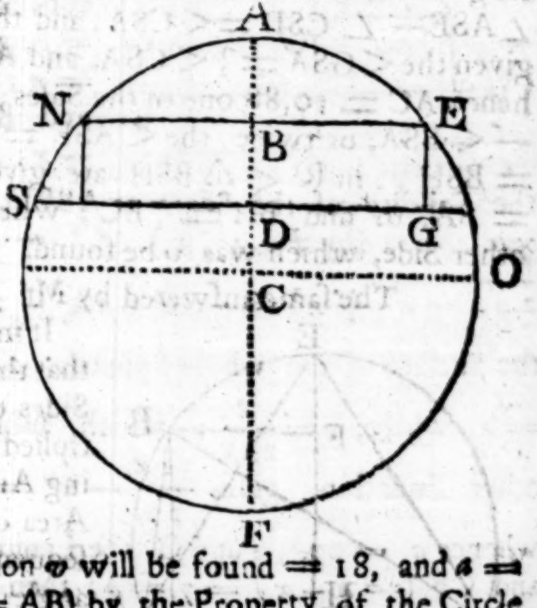
The ſame anſwered by Mr. *Joſhua Holroyd*.



It may eaſily be demonſtrated, that the Rectangle of the two Sides of a plain Triangle, multiplied by the Sine of the including Angle, is equal to double the Area of the ſaid Triangle: conſequently the Area of the Triangle required is given, and the Perpendicular being given, the Baſe is alſo given. Let ABD repreſent the Triangle required, and ABDK its circumſcribing Circle, and the Perpendicular KHE being erected on the middle of the Baſe, will paſs thro' the Centre of the Circle, and conſequently is the Diameter of the Circle; and AE and DE being drawn, the Angle AED is equal to the Angle ABD (by 21 *Eu.* 3.) and alſo let FB be drawn parallel to DA. Then in the Triangle AEH, there is given the Baſe AH = 8,25 (found by the foregoing) and the Angle AEH ($= \frac{1}{2}$ AED) = 33° 14′ 30″; and likewiſe HAE = 56° 45′ 30″; to find HE, *per Trigon.* as Sine HEA : HA :: Sine HAE : HE = 12,6; and HE—HF (= BC) = EF = 2,6; and alſo, as HE : HA :: HA : HK = 5,411, and $\overline{HK + HE}$ = KE = 18,011 = Diameter of the Circle; alſo $\overline{EF \times FK}^{\frac{1}{2}}$ = BF = HC = 6,33, and conſequently DC = 14,584, and CA = 1,924, found by adding and ſubtracting HC to and from AH. Then (*per* 47 *Eu.* 1) $\overline{\overline{AC}^2 \times \overline{BC}^2}^{\frac{1}{2}}$ = AB = 10,183, and conſequently DB = 17,678, the Sides required.

Mr. *Paul Sharp* ſays, ſince the Rectangle of the two Sides, and the included ∠ is given; the Area is alſo given, *per Trigo.* = 82,5246; which divided by $\frac{1}{2}$ the Perpendicular gives the Baſe = 16,5049; which being known, the Angles at the Baſe are found = 79° 03′ 30″ and 34° 27′ 30″. By *Theor.* 16. *Thacker's Miſc.* Then there are all the Angles, and one Side given, to find the other two Sides = 17,674, and 10,185 very nearly.

(10) Queſtion 150. anſwered by Mr. *Tho. Garrard.*



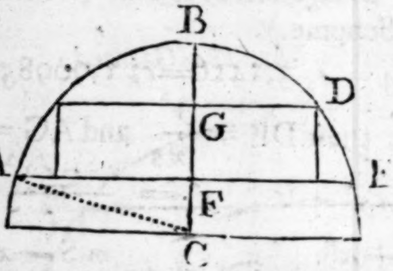
Put a = the Diameter of the circumſcribing Sphere, v = the Height of the required Segment = AD; c = 2827,44 its given Convex Superficies, s = 19339,6896 its given Solidity; and p = 3,1416 the Circumference of a Circle whoſe Diameter is Unity: then by Menſuration, $pav = c$, and $\overline{3a - 2v} \times \frac{pvv}{6} = s$; whence by a cubic Equation v will be found = 18, and a = 50. Now (putting x = AB) by the Property of the Circle

AB×BF

$AB\times BF=\overline{BE}^2=ax-xx$, which multiplied by BD $(=v-x)$ is a Maximum; which fluxed and reduced, gives $xx-45\frac{1}{5}x=300$. And by compleating the Square, &c. $x=8{,}645525$; whence BD the Height $=9{,}954475$, NE the Baſe $=36{,}733$, the double Area of the Baſe $=219{,}6$; the convex Superficies $=1148{,}7$, and the whole Superficies $=3268{,}3$, and the Solidity $=10550$ (*viz.*) ſuppoſing the greateſt Cylinder be generated by the Rotation of the Parallelogram BEGDB round BD. But if we make EG the Baſe, and EN the Height, then putting $x=BD$, $v-x=AB$, and $32+x=d+x=BF$, we have $\sqrt{dv-dx+vx-xx}\times xx$, a Maximum; or rather $dvx^4-dx^5+vx^5-x^6$ is a Maximum; which fluxed, &c. gives $xx-11\frac{2}{3}x=384$; ſolved $x=14{,}6124$; whence the Baſe of the Cylinder $=25{,}132$, the double Area of the Baſe $=992{,}14$, the convex Superficies $=1153{,}717$; and the whole Superficies $=2145{,}857$, and the whole Solidity $=7284{,}77$.

Now, ſeeing the Solidity is greater when we make the inſcribed Cylinder to be generated by the Rotation of the Parallelogram BEGDB round BD, than when we make EG the Baſe, it is evident the firſt Method is that which anſwers the Condition of the Queſtion; and that the ſuperficial Content of the greateſt Cylinder is 32583,3; and its Solidity $=10550$.

The ſame anſwer'd by *Fillinghamienſis*.



Let the Solidity of the Segment $=19339{,}6869=s$; convex Superficies $=2827{,}44=c$; $3{,}1416=p$; 52359, &c. $=n$; Rad. $CB=CD=a$; and $BF=x$; then $CF=a-x$: Now the Theorem for the Solidity of the Segment ABEF, is $\overline{3AF^2\times BF^2+BF^3}\times n$. But (by *Eu.* 47. 1.) $AC^2-CF^2=AF^2$ ∴ $3x\times\overline{2ax-x^2}+x^3=\frac{s}{n}$; or $6ax^2-2x^3=\frac{s}{n}$; alſo $4pa^2=$ the Surface of the whole Sphere ∴ $2a:4pa^2::x:2apx=c$; where, $a=\frac{c}{2px}$; which ſubſtituted for a, in the other Equation, gives $\frac{3cx}{2p}-x^3=\frac{s}{2n}$: ſolved; $x=18$, whence $a,=25$. Put FG the Length of the Cylinder $=z$, and CF $(=a-x)=7=b$; then $CG=b+z$, whence $\sqrt{a^2-\overline{b+z}^2}$

$\sqrt{a^2 - b + z^2} = DG$; therefore $pz \times \overline{a^2 - b^2 - 2bz - z^2} =$ the Solidity of the Cylinder, a Maximum; or $a^2 z - b^3 z - 2bz^2 - z^3$ is a Maximum. In Fluxions, $a^2 \dot{z} - b^2 \dot{z} - 4bz\dot{z} - 3z^2 \dot{z} = 0$. $\therefore z^2 + \frac{4bz}{3} = \frac{a^2 - b^2}{3}$; and ſolv'd $z = \frac{\sqrt{3a^2 + b^2} - 2b}{3} = 9{,}95447$. Hence the ſuperficial Content is 3269,972.

Mr. *Zach. Gaſkell* anſwers the ſame Queſtion, thus.

Put $a =$ the given Surface; $s =$ the Solidity; $c = 3{,}1416$, $v =$ Sphere's Diameter, and $z =$ Segment's Height; then *(per* two well known Theorems) $\frac{3cvz - 2cz^3}{b} = s$, and $cvz = a$. From theſe two Equations, exterminating a, we get $z = 18$, and $v = \frac{a}{cz} = 50$. Put $x =$ Cylinder's Height; then will $\overline{32 + x} \times \overline{18 - x}$ be equal to the Square of half the Cylinder's Diameter; which $\times^{d}$ into x, is to be a *Maximum*: this in *Fluxions* and reduced, gives $x = 9{,}95447$. Whence its Diameter $= 36{,}7448$. And the whole Superficies $= 3269{,}9$.

Mr. *John Thompſon* of *Witherley Bridge* ſolves it thus (ſee Mr. *Garrard's* Scheme.)

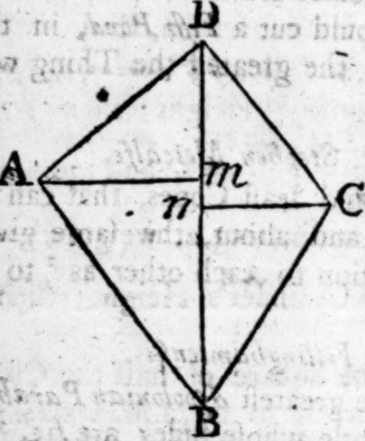
Put $19339{,}6896 = S$, $2827{,}44 = s$; $3{,}1416 = c$; $1{,}909855 = m$; $AD = x$, and $DG = y$; then $DF = \frac{y^2}{x}$, and $AG = x + \frac{y^2}{x}$ $\times^{d}$ by cx gives $cx^2 + cy^2 = s$ $\therefore y^2 = \frac{s - cx^2}{c}$; and *(per Ward*, p. 424.) $\frac{3y^2 x + x^2}{m} = S$ $\therefore y^2 = \frac{mS - x^3}{3x} = \frac{s - cx^2}{c}$; Reduced $x^3 - \frac{3s}{2c} x + \frac{mS}{2} = 0$; Solv'd $x = 18$, by which the Diameter is eaſy had $= 50 = d$; Put $AB = v$, then $\overline{dv - v^2}|^{\frac{1}{2}} = BE$, and $BD = x - v$ $\therefore \overline{dv - v^2} \times \overline{x - v} =$ a *Maximum*, in Fluxions $\overline{d\dot{v} - 2v\dot{v}} \times \overline{x - v} - dv\dot{v} + v^2 \dot{v} = 0$. Reduced $v^2 - \frac{2d - 2x}{3} v = -\frac{dx}{3}$. $\square^c$. and Root extracted, $v = \frac{d + x}{3} \pm \sqrt{\frac{\overline{d + x}^2}{9} - \frac{dx}{3}} = 8{,}0455$; from which the curve Superficies of the Cylinder is eaſy had $= 1149{,}1156$; and the whole Superficies $= 3269{,}9756$.

New MATHEMATICAL QUESTIONS *propoſed, to be anſwer'd in the next Year's* Diary.

(1) Queſtion 151 by *Tabularius.*

REQUIRED the greateſt Cylinder that can be cut out of a Solid generated by the Revolution of a *Catenaria* about its Ordinate = 50, the correſponding Abſciſſa being = 20 ?

(2) Queſtion 152, by Mr *Tho. Moſs.*



In the Trapezium ABCD are given the Sides AB (60) BC (50) the Angle ABC (74°) and the Difference of the Perpendiculars A*m* and C*n* (30) falling on the Diagonal (DB) which biſects the Angle ADC. It is propoſed, to find *geometrically*, the other two Sides, and the Area of the Trapezium ?

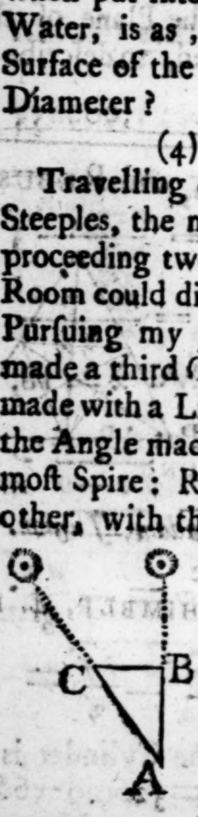
(3) Queſtion 153, by Mr. *Abr. Botham.*

Suppoſe a Globe of Wood when put in Water be obſerved to riſe two Inches above the Surface of the Water, and afterwards when put into another Liquor whoſe ſpecific Gravity to that of Water, is as ,92989 to one, it riſes only 1,25 Inch above the Surface of the Liquor ; It is required to determine the Globe's Diameter ?

(4) Queſtion 154, by Mr *Zach. Gaſkell.*

Travelling on a ſtraight Road due North, I obſerved two Steeples, the neareſt bore N.W by N, the other N.W. by W. ; proceeding two Miles, I put up at an Inn, and from an upper Room could diſcover the two Steeples ſtanding in a direct Line. Purſuing my Journey, after riding three Miles further on, I made a third Obſervation, and found the Angle that the Road made with a Line directed to the firſt mentioned Spire, equal to the Angle made by that Line and another drawn to the Weſtermoſt Spire ; Required their Bearing and Diſtance from each other, with the Conſtruction ?

(5) Queſtion 155, by Mr. *John Boſton.*



Being in an unknown Latitude *April* 1, 1754, I obſerved the Sun to riſe in a right Line with two Trees A and B ; and on *June* 7, I obſerved it to riſe in a right Line with two Trees A and C : The Diſtance of the Trees AB = 4, BC = 3, and AC = 5 Poles. Quere the Latitude of the Place ?

(6) Queſtion 156, by Mr. *Charles Wildbore* of *Nottingham*.

Required the Dimenſions of the leaſt Cone, that will circumſcribe a common Paraboloid, whoſe Solidity is $= 32572{,}1088$, and convex Surface $12996{,}3609$: As alſo the Dimenſions of of its greateſt inſcribed Conic Fruſtum?

(7) Queſtion 157, by Mr *Will. Kingſton* of *Bath*.

A Gentleman has a Piece of Land in a triangular Form, containing an Acre and half; whoſe Sides are in Proportion as 5, 6, and 8. Out of which he would cut a *Fiſh Pond*, in the Form of a Rhombus; and to be the greateſt the Thing will admit of. Required the Sides?

(8) Queſtion 158, by Mr. *Stephen Metcalfe*.

The Altitudes of the greateſt and leaſt Cones, that can be inſcribed, and circumſcribed in, and about, the ſame given prolate Spheroid, are in Proportion to each other as $\frac{2}{3}$ to 2: Quere the Demonſtration?

(9) Queſtion 159, by *Fillinghamienſis*.

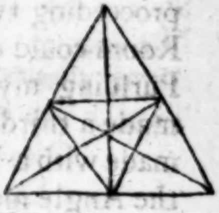
Required the Dimenſions of the greateſt *Appolonian Parabola* that can be inſcribed in a Triangle whoſe Sides are 65, 70, and 75?

(10) Queſtion 160, by Mr. *Paul Sharp*.

What Angle muſt a Projectile make with the Plane of the *Horizon*, with a given Velocity *(a) per* Second, to deſcribe in its Flight the greateſt Area poſſible?

Anſwers to the ÆNIGMAS, PARADOX, and REBUS's in the laſt Year's *Diary*.

1 A CRICKET-BALL.
2 A SHADOW.
3 TO-MORROW.
4 THE TONGUE.
5 HOPE.
6 Letter A.
7 THOUGHT.
8 An HOUR GLASS.
9 A PERRIWIG.
10 A THIMBLE.



1 Rebus, FOLKSTONE. 2 Rebus, LONDON.

All the Ænigmas anſwered, by —— *Random, Junior*.

D*OLLY* with Motion wond'rous nimble
Cou'd exerciſe both TONGUE and THIMBLE, 4. 10.
Tom fluſh'd with HOPE; fearleſs of Sorrow 5.
Agreed to marry *Doll* TO MORROW: 3.
Each with th'Impatience of A Lover 6.
Sincerely wiſh'd the Night was over:

Tom comb'd his WIGG, and like an Aſs 9
To hurry Time, he ſhook his GLASS. 8.
Doll, as ſhe walked o'er the Meadows
Wiſh'd Hours would fly as quick as SHADOWS; 2.
And as the CRICKET-BALL went paſt 1.
She pray'd that Time might fly as faſt!
Tom THOUGHT the *Town* would put its Jokes on 7.
New-married Folks, ſo quitted FOLKSTONE 1 *Reb.*
And tied the laſting *Knot* at LONDON 2 *Reb.*
Which, ſeldom ought but *Death* has undone.
Theſe vaſt *Diſcoveries*, pray hand 'em
To future Ages. —— —— *Junior Random.*

Mr. *John Reyd* of *Penryn* in *Cornwall*, anſwers them all thus.

Within a Grove, whoſe ſpreading Branches made
'Midſt Summer's Heat, a pleaſing cooling Shade:
(Here may the Reader, if he curious be
Each Tree's Poſition in the Margin ſee.)
Within this Grove fair *Chloe* did reprove
Her Shepherd *Damon* for a Breach of Love.
To clear himſelf, juſt Heav'n he did invoke!
And thus the charming *Chloe* he beſpoke.
Sooner ſhall FOLKSTONE be to LONDON join'd, 1. 2. *Reb.*
And THOUGHT for ever quit the human Mind: *Ænig.* 7.
Sooner each Hair ſhall from my PERUKE fall; 9.
And *Chloe's* THIMBLE hold a CRICKET-BALL; 10. 1.
Sooner each *Sand* in *Time's* alarming GLASS 8.
In Magnitude a *Mountain* ſhall ſurpaſs:
Sooner ſhall A forſake the *Cris Croſs* Line 6.
And SHADOWS ceaſe, tho' *Sol* moſt glorious ſhine: 2.
Sooner my TONGUE ſhall henceforth *mute* remain, 4.
Not once to HOPE it e'er ſhall *move* again: 5.
Sooner ſhall we TO MORROW overtake, 3.
Than I my deareſt *Chloe* will forſake!
This ſaid, he cloſely claſp'd her in his Arms,
Her Doubts increas'd the Luſtre of her Charms;
She own'd a *mutual* Paſſion, and confeſs'd,
That in his Love alone ſhe cou'd be bleſs'd!

Mr. *Anthony Moore* of *Grampound* in *Cornwall*, ſent us Solutions to all the *Ænigmas*, in a Soliloquy upon *Death*, written in a Country *Church Yard*.

How awful is the Scene while here I tread
Thoſe venerable Manſions of the Dead!
Around me Tombs and Sepulchres ariſe;
Silent they ſpeak—they teach me to be wiſe—

Then let them ſpeak—— nor do they ſpeak in vain,
I feel th' Impreſſions *thrill* thro' ev'ry Vein!
Time was thoſe Aſhes liv'd—A Time ſhall be 6.
When others thus ſhall ſtand, and gaze at Me.
The Clock ſtrikes Twelve —— how ſolemn is the Sound!
Hark how the Strokes from hollow Vaults rebound!
Whoſe Tomb is that?—it ſpeaks— 'tis *Mira's* Tomb,
Torn from the World in Beauties faireſt Bloom.
Mira was once the Praiſe of ev'ry TONGUE 4.
Virtuous and lovely, innocent and young:
She too with Eaſe the worthleſs Fop could trace
Deck'd out with eſſenc'd WIG, and Loads of Lace: 9.
Books, and her THIMBLE did her THOUGHTS divide, 10.7.
And all her Hours were uſefully employ'd.
What then is Life?— all SHADOW — all a Cheat, 2.
Fool'd on by HOPE, Men favour the Deceit: 5.
Life is an *Inn*, where ſcarce we ſtay to bait,
Death the ſure Paſſage to an endleſs State!
As ebbing Sands in HOUR GLASSES run, 8.
So haſtens Life, and ſoon it will be done.
Nothing is ſtable on this earthly BALL, 1.
Nothing my own, but Virtue I can call:
Awake, then, O my Soul! true Wiſdom learn,
Nor till TO-MORROW the great Work adjourn. 3.

Mr. *Sam. Bamfield* of *Honiton* in *Devonſhire*, anſwers all the *Ænigmas* in a Soliloquy on his late *Sickneſs*, as follows.

What THOUGHTS then circled! What ſtrange wondrous ſight 7.
Of FUTURE STATE appear'd, both Day and Night?— 3.
The wiſeſt TONGUE my Views could ne'er expreſs! 4.
None (unexperienc'd) can ſuch Proſpects gueſs.
One Work was good; one bad;—doubted A Crown! 6.
My HOPES like toſs'd up BALLS— now up then down: 5.1.
Sometimes full *Sun* pour'd in;— then SHADOW'd ſoon, 2.
And my ſhort GLASS ſeem'd run before 'twas Noon. 8.
Like NEEDLES driv'n *— ſharp Pains did pierce my Side;
No living WIGHT the like e'er felt, I cry'd! 9.
But kind Omnipotence diſpell'd the ſame,
And now I gratefully extol JEHOVAH's Name!

Another Solution to the *Ænigmas* in a Letter to

(2 Rebus) LONDON, *March* 21, 1755.

Dear Peggy PERUKESMORE, (9)

I have ſome THOUGHTS (7) of being at FOLKSTONE (1 *Reb.*) the Day after TO-MORROW (3), when I HOPE (5) to diſengage you from your THIMBLE (10) for an HOUR or ſo; to take A (6) GLASS (8) with me at the BALL, where we will be as merry as CRICKETS (1): you may as well hold your TONGUE (4) as make any Excuſes; for tho' you may imagine them to be very ſubſtantial ones, they will be no more than SHADOWS (2) to your Admirer, *F. F. Mingle.*

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* Alluding to a Thimble.

All the *Ænigmas* anſwer'd by *Emilia.*

To-MORROW (don't fear) from *Phylinda* you'll hear 3.
And he'll ſay that his Love is divine;
But, take care of his TONGUE, for it often tells *wrong*, 4.
Like an HOUR GLASS out of its Time. 8.
His THOUGHTS as a SHADOW are ſubject to change 7. 2.
When it's gone 'tis in vain for to call;
His WIGG and his Snuff Box employ moſt his Time 9.
Tho' he wavers as oft as A BALL. 6. 1.
I HOPE (for my ſake) my Advice you will take, 5.
And that nothing your Bliſs may deſtroy,
Till I ſee you again, when with THIMBLE and Pen 10.
We'll ſweetly our Hours employ.

Mr. *D. Davis*, Writing Maſter at *Burley* near *Minchinhampton*, ſends the following Solution to all the Ænigmas, in the good *School Boy's* Reſolution.

Dear Sir, your good Advice laſt Year, Juſtly deſerves my Thanks and Care,
You've there convinc'd me of your Love, To me it ſhall ſucceſsful prove.
As oft as *Phœbus* ſets and riſe, I'll offer up my Sacrifice;
My TONGUE ſhall ne'er my Parents grieve, Their THOUGHTS perplex, nor HOPES deceive. 4. 7. 5.
To ev'ry one concern'd with me, I'll always juſt and punctual be.
While others vainly ſpend their Time, At *Cards* and CRICKET in their Prime, 4.
Each fleeting *Moment* I'll improve (Such SHADOWS ne'er ſhall gain my Love) 2.
I'll cultivate my Mind to Day, Paſtime ſhall till To-MORROW ſtay. 3.
Neat in my DRESS I'll always go, But not fantaſtic like the Beau; 10.
My WIGGS I'll have genteelly made, But more for uſe than grand Parade; 9.
For ſtill my greateſt Care ſhall be, To cloth myſelf with Modeſty.
From All Exceſs I will abſtain, For Lux'ry has its Thouſands ſlain. 6.
Bad Company I'll always ſhun, But gladly to the Temple run.
Thus, Sir, I am reſolv'd to ſpend, The HOURS that Providence ſhall lend, 8.
That when I hear the Trumpet ſound, I may with endleſs Joys be crown'd!

We likewiſe received ſeveral good Solutions in Verſe, to all the Ænigmas, from Mr. *L. Charlton*, Mr. *Nutter*, Mr. *Wildbore*, Mr. *Handford*, Mr. *Bailey*, Mr. *Robinſon*, Mr. *Lucas*, Mr. *Heaford*, Mr. *Bacon*, Mr. *Swiſt*, Mr. *Thompſon*, *Careleſs Jack*, Mr. *Cheſter*, Mr. *Lockey*, Mr. *Dyke*, Mr. *Tarratt*, Mr. *Rowe*, Mr. *Underwood*, Mr. *Noortbouck*, Mr. *Smith*, Mr. *Drury*, Mr. *Maſon*, Mr. *Ingram*, Mr. *Watſon*, and ſeveral other of our ingenious *Contributors*; but room will not permit their Publication.

New Ænigmas to be anſwer'd next Year.

1 Ænigma (107) by Mr. *Thomas Pooke.*

IN *England* I have always been,
In *France* nor *Spain* I ne'er was ſeen;
In *Italy* have not appear'd
Nor yet in *Rome* ſince her Head rear'd:
I've in all diſtant Regions been,
And in '*Bengall* am always ſeen;
At *Goſhen* too in *Ægypt's* Land,
Where *Moſes* by divine Command,
Call'd in a Train of deadly Woes
To kill and humble *Iſr'el's* Foes.
Thus, having travel'd far and near
I now with ev'ry Thing appear;
Perhaps you'll think it very ſtrange,
I'm always ſubject ſtill to change,
Yet from the Right I never ſwerve
Tho' always forc'd a Rogue to ſerve:
There is what looks like Pride in me,
'Cauſe with the Great I always be;
But with the Poor I ne'er am found
Yet with the Beggar and the Ground
But with the Rich cannot be bound.
There's only one Month in the Year,
In which I'm ever ſeen t'appear,
And then, with eaſe I may be ſeen,
I alway am on ev'ry Green:
Take one Hint more, which now I add
No King's without me, good or bad.

2 Ænigma (108) by Mr *Charles Maſon.*

Who were my Parents few can tell, nor neither can I ſhew
I (*Hermit* like) live in a Cell, nor *Sin*, nor *Sorrow* know.
My Food the *Vitals* of my Nurſe, as *Nature* doth direct,
Which often cauſes many a Curſe, but doth not me affect,
My *Viands* being nearly ſpent, no longer *there* I dwell;
Leave a foul Houſe, and pay no Rent; deſert my *native* Cell!

3 Ænigma (109) by —— *Random, Junior.*

In Summer I the leaſt am ſeen,
Herein reſembling Night's fair Queen;
Like her, inconſtant I appear,
And various *Forms* and *Faces* wear:
As She, ſometimes obſcures from Sight
Bright *Sol's* all cheering gladſome Light;

I, in like manner ſometimes do
The brighteſt Object here below.
All *Tincts* and *Shapes*, in Me are ſeen
Red, *Yellow*, *Purple*, *Blue* and *Green* ;
Earth, *Seas*, and *Skies*, and *Beaſts* and *Birds*
My *varying* Countenance affords :
Nor, will it ſeem exceeding ſtrange
That I ſhould be ſo apt to change,
When you are told I'm faſhion'd ſtill
By fickle *Woman's* wav'ring Will :
Yet, tho' my *Fickleneſs* is owing
To *Arts* and *Works* of *Woman's* doing
This (you perhaps) will think me ſtrange in
That I prevent the FAIR from *changing*.
More of myſelf ſhould I explain
A Riddle I ſhould not remain.

4 Ænigma (110) by Mr. *Tim. Drury* of *Great Houghton* in *Yorkſhire*.

I am the rightful Empreſs of the Soul,
Do all exorbitant Deſires controul ;
Check ev'ry wild Excurſion of the Mind,
By my wiſe Dictates happily confin'd :
'Tis I, that ſhou'd o'er all your Senſe preſide
Correct your Notions, and your Judgment guide;
But falſe Opinions rooted in the Mind,
Hoodwink the Soul, and keep me always blind :
My Dwelling ne'er is found with gaudy Things
Whoſe ſhort Enjoyment no true Pleaſure brings ;
But have an Empire of a nobler Kind,
My regal Seat's in the cœleſtial Mind ;
Where, with a God-like, and a peaceful Hand
I rule, and make thoſe happy I command :
For while I govern, all within's at reſt,
No ſtormy Paſſion revels in the Breaſt :
But, when my Power is deſpicable grown,
And rebel Appetites uſurp my Throne ;
The Soul no longer quiet Thought enjoys,
But all is Tumult, and eternal Noiſe !

5 Ænigma (111) by Mr. *Sam. Hammond* of *Nottingham*.

Though I in HEAVEN firſt began to *be*,
Yet GOD, who all Thing formed, made not *me* ;
For, ſeem the Propoſition e'er ſo odd,
Creating *Me*, he'd ceaſe to be a GOD ;

And yet 'tis ſomething *excellent* and *good*
That gives *Me* Being, or ſo *underſtood.*
  Thro' *Me* frail *Adam* fell, juſt *Abel* dy'd,
Young *Jacob* left his Home to ſeek a Bride;
Thro' *Me* lov'd *Rachel* made his Anger burn,
And it was *Me* that haſten'd his Return.
I Author was of *Joſeph's* abject State,
Whence he became ſo eminently great;
And *He* that *Iſrael* freed from Bondage vile
By means of *Me* was caſt into the *Nile.*
  With *Young* and *Old* I'm very much in Faſhion,
Eſpecially 'mongſt thoſe o'th' ſame *Vocation*;
With *Underlings* in ev'ry *Art* and *Science*,
Wealth, *Honor*, *Beauty*, *Wit*, in cloſe *Alliance*:
Yet no Man living ever was above me,
And they who are below me often love me;
Though from my Pride and Jealouſy proceed
Wrath, *Hatred*, *Malice*, ev'ry cruel Deed.
  Like *Malefactors* hung in Chains alive
I prey upon myſelf, and think I thrive;
But all's a groſs Deluſion, for (as they)
The more I gnaw the more I pine away.
  Some think the ſquinting Leer and meagre Face
Deriv'd from *Me* in thoſe of *Jewiſh* Race,
As being *emblematical* of *Me*;
Declare my *Name*, and trace my *Pedigree.*

6 Ænigma (112) *per Jacobum Whitley, Hiſtrionem.*

  Around the ebon Throne of gloomy Night
E'er Sin-ſtain'd Satan takes his vagrant Flight;
Or e'er the orient-Beam of roſy Morn
Gilds the gay Spangles on the pointed Thorn;
Or when the ſilver Regent of the Sky
Illumes the nether Globe, from *Latmos* high
And Stars imprint the concave Canopy:
When golden *Phœbus* glads with genial Ray
In his progreſſive Ride, the Noon of Day
With dulcet Notes I ſooth th' attentive Ear
Or tremulate the guilty Soul with Fear.
In drear Uncertainty I always roam,
No Town my Tenement, no Houſe my Home;
Yet, ſuch my Life, I emulate the Wiſe,
Tho' I'm to ev'ry Vice a Sacrifice.
No mortal Man can more a Patriot be
I one Day die to ſet my Nation free;

Yet, the next Night tyrannically brave,
I ſtruggle hard my Country to enſlave.
In royal Pomp at ſmiling Seaſons plac'd
High in Eſteem by fickle Fortune grac'd.
No Form appears more great or good than I,
Dear to the Heart, and lovely to the Eye!
In four and twenty Score of Moment's Space
(Of ſuch a Nature is my hapleſs Caſe)
My ſplendid Covering of gaudy Hue
Is into Rags inverted, Red and Blue;
In ſuch a tatter'd and dejected State
As that of *Laz'rus* ſet at *Dives'* Gate;
Tho' ſtrange, moſt true it is, I'm then moſt free,
And bleſs'd amidſt lean-ſided Poverty.
Of Grief and Joy I Portions can diſpenſe,
Deſpis'd by Fools, I'm priz'd by Men of Senſe:
One Thing I boaſt, my chief Felicity,
The ſecret Murder is reveal'd by Me;
And antient Heroes long in Silence laid,
Are by my Magick now immortal made:
All the wide World for me is but a Round
And ev'ry Man within it like me found:
Of each Religion in this earthly Ball
Turk, *Jew* and *Chriſtian*, *Infidel*, and All!
Old Hydra-headed Vice I always ſhame
And yield white Virtue an eternal Fame.

7 Ænigma (113) by Mr *Cha. Wildbore* of *Nottingham*.

Attend ye Artiſts to my Fame, And you will quickly know my Name.
I am a Monſter without doubt, That antient Sages put to rout,
And made 'em own, againſt their Will, The Weakneſs of their magic Skill:
I am a Beaſt of Prey alſo, Whoſe frightful Corps doth ſtrangely go;
Voracious too I thirſt for Blood, My Habitation's in a Wood;
In which (for to ſurprize you more) My Suſtenance is human Gore:
My ſanguine and voracious Clan Do chiefly haunt the *Iſle of Man*,
Where, if I'm taken, wretched Fate, I feel the Weight of human Hate,
Without Reſiſtance loſe my Breath, Am burn't alive, or rack'd to Death.
I now my wondrous Tale have told, from which you may my Name unfold.

8 Ænigma (114) by Mr. *Iſaac Tarratt* of *Epſom*.

My Age unknown, yet reſident on Earth,
Tho' *Locke* affirms the Devil gave me Birth.
Gulliver ſays he knew me very well,
And where he's been his Travels plainly tell.
Fam'd *Ariſtotle* I did oft frequent,
And ſubtle *Stilpo* into Exile ſent.

I've poiſon'd more than e'er *Ducoſto* did
My Banes more dangerous and more cloſely hid.
Good Lord! 'twou'd make you laugh was I to tell,
What pretty Tricks I play'd with *Machiavelli*;
I gain'd Eſteem with many a Roman Dame,
Bold *Juvenal* records it to their Shame;
My callid Slights can raiſe to ſuch a Pitch,
You'd almoſt ſwear, I was ſome Circean Witch;
Of Bad make Good, and Wrong transform to Right,
And, with much Care, can make a Raven white.
And ſtill a more ſurprizing Wonder yet,
Can of a Ninney, make a wondrous Wit,
And I (but now you'll ſay I'm full of Jokes)
Can ſerve Attorneys like a *Jack-a-Nokes*,
Creep into Courts, and there upon 'em wait,
And, undiſcover'd, Miſchief perpetrate.
When both the Houſes do aſſembled ſit,
You'll find me buſy as a Grub-ſtreet Wit;
Sometimes indeed, I have diſcover'd been,
But, to be plain, am very rarely ſeen;
But, too well known, and to confeſs the Truth,
You'll find me aping of a lovely Youth:
My Emblem is, a Prince in Maſquerade,
Excuſe me Belles, I fear too much I've ſaid.

Tabularius has ſent us the following Noſegay of Flowers; enquiring, what is,

1. The Glory of the Creation?
2. What Inſects produce, and the Nurſes Employment?
3. The Vehicle of a triumphant Hero, and what a King rules?
4. Half congealed, and what a Sot unwillingly leaves?
5. Bitter's Antagoniſt, and the Conqueror of England?
6. A philoſophical Inſtrument, and what a Parſon wears in his Hat?
7. The Emblem of Conſtancy, and a Sot's Delight?
8. The Father of a King of Iſrael, and the Parent of Riches?
9. A vain Youth?
10. A bright Object, and a City in Aſia?
11. The ſecond Perſon in Latin, and the Seat of Salutation?
12. Juno's Meſſenger?
13. A terreſtrial Ball, and the Arms of Scotland?
14. The Ornament of an Emperor?
15. What lies low, flies high, and what adds ſpeed to a Horſe?
16. What the Jealous never enjoy?
17. The Support of an Houſe, and the Duſt of a Mill?
18. The Support of a Dairy, and a falſe Step?
19. A fine Bird, and the Organ of Sight?
20. The moſt bleſſed of Women, and the fineſt of Metals?
21. A muſical Inſtrument, and a Particle in Latin?

An *Alphabetical Catalogue* of Contributors to this *Diary*; the Fig. 1, 2, 3, &c. ſhewing the Queſtions, the Numerical Letter i, ii, &c. the Ænig. and P. R. & An. the Paradox Reb. & Anagr. Reb. each anſwd.

MR Tho. Allen 1, 5, 6, & 10. all Æ. P. R. An. Mr Anth. Arch all Æ. P. R. An. Ver. all Q. Angelica all Æ. Mr Tho. Breaks all Æ. in Ver. Prop 2 Æ. Mr Wm Bailey all Æ. P. in Ver. Mr Wm Bacon 9, all Æ. P. R. in Ver. Mr Ab. Botham 5, 7, 8, 10. all Æ. but v. prop. 1 Q. Mr Wm Bevil 2, 4, 5, 7, 8. Mr Joſ. Briſcall P. R. An. Mr John Boſton 5, 8, 10. i, ii, iii, v, viii, ix, x. Prop. 1 Q. Mr Geo. Butler all Æ. P. R. An. prop. 1 Æ. Mr Sam. Bamfield all Q. but 3. all Æ. P. R. An. in Ver. prop. 1 Æ. Miſs Bridget all Æ. prop. 1 Æ. Miſs Polly Bright all Æ. Mr Lionel Charlton all Q. all Æ. P. R. An. in Ver. prop. 1 Q. & 1 P. Mr Chriſt. Cooke i, v, vi, vii. Jack Careleſs all Q. but 1, 3. all Æ. P. R. An. in Ver. Mr John Cheſter all Æ. P. R. An. in Ver. Mr Rob. Dalton i, ii, iii, v, vi, viii, ix, prop. 2 P. Mr D. Davis all Æ. in Ver. prop. 2 Æ. Mr John Dyke all Æ. P. R. An. in Ver. Mr Tim. Drury 7, 8, 10. all Æ. P. R. An. in Ver. Mr Benj. Donn all Q. Mr Wm Downing all Q. Mr John Doubtful all Q. but 3. Mr Luke Elſtob i, ii, viii. Emilia all Æ. P. in Ver. Miſs Enfield all Æ. Mr John Edwards all Q. Fillinghamienſis 5, 8, 9, 10. Mr Tho. Garrard all Q. all Æ. P. R. An. Mr Zach. Gaſkell 1, 2, 5, 6, 7, 8, 10. George—— all Q. all Æ. in Ver. prop. 1 Æ. & 1 P. Mr Sam. Handford all Æ. in Ver. Mr Chriſt. Hudſon ii, v, R. prop. 2 Æ. Mr Joſhua Holroyd 7, 8, 9, 10. all Æ. but v. P. R. An. Mr Wm Heaford all Æ. P. R. An. in Ver. Mr Tho. Hare 1, 3, 8, 10. all Æ. but iii, & iv R. Mr Joſ. Heartley all Æ. but iii, iv. prop. 1 Æ. Mr Jacob Hill, Officer in the Exciſe, all Æ. prop. 2 P. Mr John Hammond all Æ. but iii. prop. 1 Æ. & 1 P. Mr James Hain all Æ. P. R. An. in Ver. Mr Sam. Hammond all Æ. P. R. An. prop. 1 Æ. & 3 R. Miſs Dolly Holden all Æ. Miſs Julia Handiſide all Æ. in Ver. Mr Wm Ingram all Æ. P. R. An. in Ver. Mr Wm Kingſton all Q. all Æ. P. R. An. prop. 1 Q. Mr Wm Lockey all Æ. P. R. An. in Ver. Mr Tho. Lampit all Æ. in Ver. prop. 2 R. Mr Wm Lucas 2, 7. 8. all Æ. P. R. An. Mr Anth. Moore all Æ. in Ver. prop. 1 Æ. F. F. Mingle all Æ. in Proſe prop. P. Mr Tho. Moſs all Q. prop. 2 Q. Mr Steph. Metcalfe 8, 9, 10. prop. 1 Q. Mr Chriſt. Maſon all Æ. P. R. An. in Ver. prop. 2 Æ. Mr Rob. Marſh all Æ. but vii. P. R. An. Mr Cha. Maſon 4, 8, 10. prop. 1 Q. Mr John Nutter all Æ. in Ver. prop. 1 Æ. Mr J. Noorthouck all Æ. P. R. An. in Ver. Mr John Pickburn prop. 1 Æ. Philanthropos —— Mr Tho. Pooke all Æ. but vi. prop. 1 Q. Mr John Palmer all but vii. in Ver. Mr John Pinchem all Q. Miſs Sally Poole all Æ. in Ver. Mr John Reyd all Æ. P. R. An. in Ver. Mr Wm Richardſon i, iii, v, vi, vii, viii, ix. R. An. Mr J. Randles —— Random Junior all Æ. in Ver. prop. 1 Æ. Mr Ed. R[illegible]on all Æ. but iv. in Ver. prop. 1 R. Miſs Sop. Rogers all Æ. R. M[illegible]ſton Richardſon P. Mr Alex. Rowe 4, 8, 9. all Æ. P. R. An. in Ver. Mr John Randles prop. 1 Æ. Mr Wm Swift all Æ. in Ver. prop. 2 Æ. & 1 R. Mr Wm Smith all Æ. P. R. An. in Ver. prop. 1 Q. 1 Æ. 1 P. Mr Paul Sharp 7, 8, 9, 10. all Æ. but iii, iv. prop. 1 Q. Mr Wm Spicer 2, 4, 8, 9, 10. Mr John Thompſon 5, 8, 10. prop. 1 Q. Mr John Tapner all Æ. but iii, & x. P. R. An. Tabularius prop. 2 Q. Mr John Thompſon all Æ. in Ver. prop. 1 Æ. 1 P. Mr Iſaac Tarratt all Æ. P. R. An. prop. 1 Æ. Mr Cha. Underwood all Æ. in Ver. prop. 1 Æ. Mr Ric. Waddington prop. 1 Æ. Mr Cha. Wildbore 1, 3, 4, 5, 7, 8, 9, 10. all Æ. P. R. An. in Ver. prop. 1 Q. Mr Hugh Weetman 7, 8, 10. Mr Geo. Watſon all Æ. P. R. An. in Ver. prop. 1 Æ. Mr Math. Ward's laſt Year's Letter was miſlaid.

FINIS.